



TETRA TECH

October 5, 2016

Ms. Diane McDaniel
Department of Environmental Protection
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222

Mr. Griff Miller
USEPA Region 3
RCRA Corrective Action (3LC30)
1650 Arch St
Philadelphia, PA 19103

**Re: Raccoon Creek Groundwater, Surface Water, and Sediment Sampling Report
Third Quarter 2016
Former Lyondell Beaver Valley Site
Lyondell Environmental Custodial Trust
Potter Township, Pennsylvania**

Dear Ms. McDaniel and Mr. Miller:

On behalf of the Lyondell Custodial Trust (Trust), Tetra Tech, Inc. (Tetra Tech) has prepared this letter to summarize the results of the Third Quarter 2016 Raccoon Creek Area groundwater, surface water, and sediment sampling, and thermal image collection event at the Former Lyondell Beaver Valley site (Site) in Potter Township, Pennsylvania. The sampling event was conducted at the request of the Pennsylvania Department of Environmental Protection (PADEP) and the United States Environmental Protection Agency (USEPA). Tetra Tech completed the Third Quarter Raccoon Creek Sampling on August 15 and 16, 2016, in accordance with the approved 2016 Sampling Work Plan dated April 27, 2016 and the work plan addendum dated June 1, 2016.

GROUNDWATER SAMPLING SUMMARY AND RESULTS

Raccoon Creek flow conditions were documented on August 15, 2016 prior to sampling. The documentation included data from the on-site staff gauge, and available flow and water level data from the following USGS gauging stations located near the Raccoon Creek Area.

- USGS gauging station 03108000 at Raccoon Creek at Moffatts Mill, PA
http://waterdata.usgs.gov/usa/nwis/uv?site_no=03108000
- USGS gauging station 03108010 at Fishpot Run near Shippingport, PA (tributary to Raccoon Creek)
http://waterdata.usgs.gov/nwis/dv/?site_no=03108010&PARAmeter_cd=00060
- USGS gauging station 03108490 on Ohio River above Montgomery Dam & Locks at Ohierview, PA (downstream to Raccoon Creek on Ohio River but in the same pool as Raccoon Creek) <http://waterdata.usgs.gov/usa/nwis/uv?03108490>

The staff gauge SG-1 indicates that surface of Beaver Creek was 682.25 feet above mean sea level is presented in Table 1.



Graphs depicting the USGS gaging station data are included in Attachment 1. The USGS gauging information, indicates that Raccoon Creek discharge was near the seasonal median (Attachment 1; USGS station at Moffatts Mill).

Groundwater and light non-aqueous phase liquid (LNAPL) liquid levels were gauged with an interface probe. The liquid levels were recorded to the nearest 0.01 foot. The depth to groundwater ranged from 7.57 feet below the top of casing (btc) in MW-163S to 48.06 feet btc in MW-501D. LNAPL was present in MW-161 at a thickness of approximately 0.01 feet. The well gauging data is presented in Table 1.

A groundwater potentiometric contour map was completed for the August 2016 synoptic water level event. Figure 2 depicts the shallow groundwater potentiometric surface map for the August 2016 event. The August 15, 2016, groundwater flow direction was southwest to south-southwest, away from and perpendicular to Raccoon Creek. The August 15, 2016 surface water elevation in Raccoon Creek was higher relative to the potentiometric surface data in all wells measured in the Raccoon Creek Area. This suggests that Raccoon Creek is a losing stream in this area. The August 15, 2016, groundwater flow direction is similar to previous gauging events.

On August 15 and 16, 2016, groundwater samples were collected from MW-120, MW-159, MW-160, MW-162, and MW-163S with a bladder pump, utilizing low-flow sampling techniques. The sample from MW-501S was collected using a peristaltic pump because a bent well casing prohibited the use of a bladder pump, and MW-161 was not sampled due to the presence of LNAPL. Field parameters were measured with Horiba Model #U-52 and recorded during purging and at the time of sample collection. The field parameters included pH, specific conductance, temperature, turbidity, and dissolved oxygen. A well was considered stabilized and ready to sample once three consecutive readings were within the following criteria:

Field Parameter	Stabilization Criteria
pH	+/- 0.1 standard pH unit
Temperature	+/- 3%
Specific Conductance	+/- 3%
Dissolved Oxygen	+/- 10%
Turbidity	+/- 10%
Oxidation-Reduction Potential	+/- 10 mV



The final field parameter readings are summarized in Table 2. Field data log sheets from the collected groundwater samples are presented in Attachment 2. Each sample was analyzed for the following:

- Benzene, Ethylbenzene, Toluene, and Xylenes (BTEX) using EPA Method 8260
- Target Analyte List (TAL) dissolved metals using EPA Method 6010 (7470 for mercury)

The samples were sent to TestAmerica Laboratories, Inc. in Pittsburgh, PA for analysis.

A summary of the analytical results is provided below. The analytical results are tabulated in Table 3 for chemical compounds detected in at least one well. Figure 3 depicts the chemicals of concern above Pennsylvania Act 2 Statewide Health Standard, Residential, Used Aquifer, TDS \leq 2500 Medium Specific Concentrations (MSCs) criteria. The laboratory analytical reports are presented in Attachment 3.

Benzene was the only volatile organic compound detected at concentrations over the aforementioned MSCs criteria. Benzene exceeded the MSC criteria in five wells sampled (MW-159, MW-160, MW-162, MW-163S, and MW-501S), ranging in concentration from 2000 $\mu\text{g/L}$ in MW-163S to 55,000 $\mu\text{g/L}$ in MW-501S. In general, third quarter benzene concentrations in the five wells (MW-159, MW-160, MW-162, MW-163S, and MW-501S) are consistent with the previous data.

Nineteen dissolved metals (aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, sodium, vanadium, and zinc) were detected at concentrations above the laboratory detection limits; however, only eleven metals (arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, thallium, vanadium, and zinc) were detected at concentrations greater than the MSCs criteria.

Purge water was containerized in 55-gallon drums and was disposed of at an appropriate facility, in accordance with regulations.

THERMAL IMAGE COLLECTION

Thermal images were collected along Raccoon Creek on August 18, 2016 to confirm the thermal imaging results from July and to potentially optimize the locations for the surface water and sediment samples.

A handheld thermal imaging camera (Testo 875 series) was utilized. Numerous thermal images were taken from a boat to identify potential locations where groundwater may be discharging to Raccoon Creek. A hand held GPS unit was used to record the photograph locations. Figure 4 shows the locations of where the thermal images were collected. The thermal images are included in Attachment 4. The August 2016 thermal image results were similar to those collected in July 2016. Below is a brief description of the images collected in August 2016.



The groundwater temperature in the Raccoon Creek Area monitoring wells was approximately 54 to 57 degrees Fahrenheit (F). The surface water temperature in Raccoon Creek was significantly warmer (approximately 71 to 73 degrees F) as measured by the thermal camera. Images collected near the Raccoon Creek Soil Cover/Capped Area, image locations 829 thru 838, do not depict temperature differentials indicative of groundwater discharge to Raccoon Creek. This supports the possibility that groundwater does not discharge into Raccoon Creek and that Raccoon Creek is a losing stream as suggested by the groundwater elevation data described above.

The thermal imaging camera did detect significant temperature differentials at two locations outside of the Raccoon Creek Soil Cover/Capped Area. At image location 825, the discharge from the BASF outfall was detected at higher temperatures with respect to the surface temperatures in Raccoon Creek (Attachment 4). At image location 841, upgradient of the Soil Cover/Capped Area, a seep from the bedrock outcrop had a temperature of 58 degrees F that was significantly lower than the temperature in Raccoon Creek of 69 degrees F (Attachment 4).

Note that this instrument only measures temperature at the surface and cannot be used to determine if groundwater is discharging to Raccoon Creek at depth. Also note, there are several images with indications that the surface of the water is slightly cooler (within 1 to 2 degrees F) close the surface water/land interface. These temperature differentials are likely due to thermal reflection from the cooler shaded area on shore and is not an indication of groundwater discharge.

SURFACE WATER SAMPLING SUMMARY AND RESULTS

Tetra Tech mobilized to the Site on August 18, 2016 to conduct the surface water sampling event. A total of nine surface water samples (SW-1 through SW-9) were collected. The surface water sample locations were not altered from the locations initially planned in the Work Plan (submitted on April 27, 2016). This decision was made in accordance with the Work Plan Addendum (Tetra Tech June 1, 2016 letter to PADEP and USEPA) because there was no evidence or indication of groundwater discharge to surface water as described above.

As illustrated in Figure 5, surface water sample locations SW-1 through SW-3 represent upstream conditions along Transect 1, SW-4 through SW-6 are near to the Raccoon Creek Soil Cover/Capped Area along Transect 2, and SW-7 through SW-9 are downgradient of the Soil Cover/Capped Area along Transect 3. Transect 2 and 3 are at approximately the same location as samples collected in 1998, Transect C (SW-4 through SW-6), and Transect E (SW-7 through SW-9). A hand held GPS unit was used to record the surface water sampling locations.

Field parameters (pH, temperature, specific conductance, dissolved oxygen, and turbidity) were collected from each sampling point and recorded on a field log sheet prior to sample collection. The field parameter readings are summarized in Table 4. Field data log sheets from the surface water samples are presented in Attachment 2. The samples were collected by directly pouring the surface water into laboratory-supplied containers.



The samples were analyzed for:

- BTEX using EPA Method 8260
- TAL metals (total and dissolved) using EPA Method 6010 (7470 for mercury)

The samples were sent to TestAmerica Laboratories, Inc. in Pittsburgh, PA for analysis.

A summary of the analytical results is described below. The analytical results are tabulated in Table 5. The samples were screened against the PADEP Chapter 93 Water Quality Standard for both ecological and human health criteria. The laboratory analytical reports are presented in Attachment 3.

BTEX compounds were not detected at concentrations over the laboratory reporting limit.

Fifteen total metals (aluminum, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, and zinc) were detected and seven dissolved metals (barium, calcium, copper, magnesium, manganese, potassium, and sodium) were detected at concentrations above the laboratory detection limits. However, only total aluminum exceeded the ecological screening value of 750 µg/L in one upstream sample (SW-01) with a result of 820 µg/L.

SEDIMENT SAMPLING SUMMARY AND RESULTS

Tetra Tech mobilized to the Site on August 18, 2016 to conduct the sediment sampling event in Raccoon Creek. Three sediment samples (SED-1, SED-2, and SED-3) were collected along the bank of Raccoon Creek as illustrated on Figure 5. SED-1 was collected upstream of the Soil Cover/Capped Area, SED-2 was collected near the Soil Cover/Capped Area, and SED-3 was collected downstream of the Soil Cover/Capped Area. A hand held GPS unit was used to record the sediment sample locations. The samples were collected slightly below the water surface near the stream bank/surface water interface using a hand auger.

The samples were analyzed for:

- BTEX using EPA Method 8260
- TAL metals using EPA Method 6010 (7470 for mercury)

The samples were sent to TestAmerica Laboratories, Inc. in Pittsburgh, PA for analysis.

A summary of the analytical results is described below. The analytical results are tabulated in Table 6. The samples were screened against both an ecological and human health criteria. The ecological criteria consist of a combination of the NOAA Squirt Freshwater Sediment Screening Values and the EPA Region 3 BTAG Freshwater Sediment Screening values. The NOAA Squirt and Region 3 BTAG Screening values are considered conservative. The human health criteria was the PADEP Statewide Health Standard, Residential, Direct Contact (0'-15'), MSC criteria. The laboratory analytical reports are presented in Attachment 3.

BTEX compounds were not detected at concentrations over the laboratory reporting limit.



Twenty metals (aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, sodium, vanadium, and zinc) were detected at concentrations above the laboratory detection limits. However, only seven metals (arsenic, barium, cadmium, chromium, cobalt, iron, manganese, and nickel) were detected at concentrations over the ecological screening values and only four metals (arsenic, cadmium, cobalt, and vanadium) were detected over the human health criteria.

Upstream sample (SED-1) results were similar to those collected near Raccoon Creek Soil Cover/Capped Area (SED-2) and downgradient (SED-3) of the Raccoon Creek Soil Cover/Capped Area. For example, the iron detected in SED-1 was 24,000 mg/kg as compared to detections in SED-2 (25,000 mg/kg) and SED-3 (25,000 mg/kg) and vanadium detected in SED-1 was 19 mg/kg as compared to detections in SED-2 (24 mg/kg) and SED-3 (18 mg/kg).

CONCLUSION

Tetra Tech is pleased to have the opportunity to continue to serve the Trust, the PADEP, and the USEPA on this project. Tetra Tech looks forward to discussing the 2nd and 3rd quarter sampling results with the PADEP and USEPA. The next round of groundwater sampling will be conducted in November 2016. Please contact me at (412) 921-8398 or at Keith.Henn@tetratech.com if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Keith Henn".

Keith Henn, PG
Senior Project Manager

Attachments:

Tables 1 through 6
Figures 1 through 5
Attachments 1 through 4

cc: Lyondell Environmental Custodial Trust (w/attachments)
Oscar Vazquez-Martinez, PADEP (w/attachments)
Michael Kovacich, Tetra Tech, Inc. (w/attachments)
Jonathan Aglio, Tetra Tech, Inc. (w/attachments)
Derek Amidon, Tetra Tech, Inc. (w/attachments)

TABLES

Table 1
Groundwater Gauging Data
Former Lyondell Beaver Valley Site
Potter Township, Pennsylvania

Location	Top of PVC/Pipe Elevation ⁽¹⁾	Depth to LNAPL (ft) ⁽²⁾⁽³⁾	Depth to Water (ft) ⁽³⁾	Groundwater Elevation ⁽¹⁾	Depth to LNAPL (ft) ⁽²⁾⁽³⁾	Depth to Water (ft) ⁽³⁾	Groundwater/Surface Water Elevation ⁽¹⁾	Depth to LNAPL (ft) ⁽²⁾⁽³⁾	Depth to Water (ft) ⁽³⁾	Groundwater/Surface Water Elevation ⁽¹⁾	
9-Nov-15		20-Jun-16		15-Aug-16							
MW-120	708.34	NM	25.80	682.54	0.00	25.48	682.86	0.00	26.12	682.22	
MW-159	706.92	NM	24.45	682.47	0.00	25.24	681.68	0.00	25.81	681.11	
MW-160	697.17	NM	17.29	679.88	0.00	17.09	680.08	0.00	17.52	679.65	
MW-161	700.71	19.25	19.26	681.45	19.07	19.08	681.63	19.40	19.41	681.30	
MW-162	702.08	NM	22.44	679.64	0.00	22.07	680.01	0.00	22.63	679.45	
MW-163S	687.49	NM	7.42	680.07	0.00	7.25	680.24	0.00	7.57	679.92	
MW-501S	698.66	NM	17.78	680.88	0.03	17.46	681.20	0.03	17.93	680.73	
MW-501D	698.66	NM	48.10	650.56	0.00	47.89	650.77	0.00	48.06	650.60	
SG-1	683.73	NA	NA	NA	NA	1.15	682.58	NA	1.48	682.25	

Notes:

1 - Feet Above Mean Sea Level

2 - Light Non-Aqueous Phase Liquid

3- Measured Depth Below Top of Casing

NA = Not Applicable

NM = No Measurable LNAPL

Table 2
Groundwater Chemistry Field Measurements
August 2016 Sampling Event
Former Lyondell Beaver Valley Site
Potter Township, Pennsylvania

Well ID	Date	Temperature (°C) ⁽¹⁾	pH (SU) ⁽²⁾	Specific Conductivity (mS/cm) ⁽³⁾	Turbidity (NTUs) ⁽⁴⁾	ORP (mvolts) ⁽⁵⁾	DO (mg/L) ⁽⁶⁾
MW-120	08/16/16	14.95	7.26	1.34	0.00	-184.0	0.40
MW-159	08/15/16	14.30	6.12	2.03	12.60	-84.0	0.75
MW-160	08/15/16	13.81	6.61	1.52	0.00	-142.0	0.50
MW-162	08/16/16	15.13	6.89	1.96	0.00	-136.0	0.31
MW-163S	08/15/16	15.42	5.01	1.87	117.00	-7.0	0.37
MW-501S	06/21/16	14.05	2.79	8.90	9.32	189.0	0.43

Notes:

Field parameters measured at the conclusion of purging with a Horiba water quality instrument.

⁽¹⁾ °C = degrees celcius

⁽²⁾ SU = Standard Unit

⁽³⁾ mS/cm = millisiemens/centimeter

⁽⁴⁾ NTUs = Nephelometric Turbidity Units

⁽⁵⁾ mvolts = millivolts

⁽⁶⁾ mg/l = milligrams/liter

Table 3
Groundwater Analytical Results
Former Lyondell Beaver Valley Site
Potter Township, Pennsylvania

LOCATION:	PADEP Residential Used Aquifer MSC ⁽¹⁾	MW120	MW120	MW120	MW-120	MW-120	MW159	MW-159	MW-159	MW160	MW-160	MW-160	
SAMPLE ID:		MW120	MW120-AVG	MW120-D	MW-120	MW-120	MW159	MW-159	MW-159	MW160	MW-160	MW-160	
SAMPLE DATE:		20151109	20151109	20151109	20160620	20160816	20151110	20160621	20160815	20151111	20160620	20160815	
SAMPLE CODE:		ORIG	AVG	DUP	ORIG								
MATRIX:		GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	
DISSOLVED METALS (UG/L)													
ALUMINUM	NC	37 J	38.5	40 J	200 U	48 J	200 U	49 JB	56 J	200 U	200 U	200 U	
ARSENIC	10	50 U	30 U	10 U	51	13 B	10 U	50 U	10 U	4.7 J	10 U	10 U	
BARIUM	2000	60 J	60.5	61 J	160 J	110 J	42 J	38 J	30 J	62 JB	52 J	65 J	
BERYLLIUM	4	4 U	0.24 J	0.24 J	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	
CADMIUM	5	5 U	5 U	5 U	5 U	0.86 J	0.29 J	0.32 J	1.2 J	5 U	5 U	0.98 J	
CALCIUM	NC	370000 B	375000	380000 B	110000	200000	220000 B	240000	240000	130000	69000	130000	
CHROMIUM	100	30	34	38	2.8 J	5 U	30	19	25 U	5 U	5 U	5 U	
COBALT	11	130	130	130	3 J	2.3 J	27 J	26 J	29 J	0.98 J	1.5 J	50 U	
COPPER	1000	4.2 J	4.45	4.7 J	25 U	25 U	3.4 J	25 U	3.7 J	1.4 JB	25 U	25 U	
IRON	NC	91000	91000	91000	35000	28000	39000	34000	38000	30000 B	11000	36000	
LEAD	5	4.1 J	4.05	4 J	10 U	10 U	3.8 J	3.2 J	6.9 J	10 U	10 U	10 U	
MAGNESIUM	NC	80000	80500	81000	18000	30000	43000	45000	46000	26000	8200	29000	
MANGANESE	300	98000 B	97500	97000 B	4500	22000	78000 B	69000	80000	4800 B	1700	6200	
NICKEL	100	80	80	80	40 U	5.4 J	55	52	58	14 J	4.5 J	16 J	
POTASSIUM	NC	2100 JB	2150	2200 JB	4300 J	1400 J	2200 JB	2800 J	2400 J	3400 J	4500 J	2700 J	
SELENIUM	50	50 U	13 J	13 J	4.2 J	10 U	12 J	50 U	50 U	4.5 J	4.6 J	10 U	
SILVER	100	25 U	25 U	25 U	5 U	5 U	3.6 J	25 U	25 U	5 U	5 U	5 U	
SODIUM	NC	83000 B	83500	84000 B	94000	60000	110000 B	120000	130000	110000	51000	150000	
THALLIUM	2	26 J	28	30 J	20 U	20 U	21 J	18 J	100 U	20 U	20 U	20 U	
VANADIUM	260	9.5 J	10.25	11 J	50 U	50 U	5.1 J	8.4 J	50 U	50 U	50 U	50 U	
ZINC	2000	22 B	22	22 B	20 U	20 U	8.1 JB	39	24	20 U	20 U	20 U	
TOTAL METALS (UG/L)													
ALUMINUM	NC	47 J	47 J	200 U	NA	NA	60 J	NA	NA	81 J	NA	NA	
ARSENIC	NC	50 U	50 U	50 U	NA	NA	10 U	NA	NA	5.2 J	NA	NA	
BARIUM	NC	61 J	60	59 J	NA	NA	43 J	NA	NA	66 JB	NA	NA	
BERYLLIUM	NC	4 U	4 U	4 U	NA	NA	0.18 J	NA	NA	4 U	NA	NA	
CALCIUM	NC	370000 B	365000	360000 B	NA	NA	230000 B	NA	NA	130000	NA	NA	
CHROMIUM	NC	29	29	29	NA	NA	31	NA	NA	5 U	NA	NA	
COBALT	NC	130	130	130	NA	NA	28 J	NA	NA	0.99 J	NA	NA	
COPPER	NC	3.6 J	3.85	4.1 J	NA	NA	3.7 J	NA	NA	1.2 JB	NA	NA	
IRON	NC	91000	90500	90000	NA	NA	43000	NA	NA	35000 B	NA	NA	
LEAD	NC	3.8 J	3.4	3 J	NA	NA	5.4 J	NA	NA	10 U	NA	NA	
MAGNESIUM	NC	81000	79500	78000	NA	NA	45000	NA	NA	26000	NA	NA	
MANGANESE	NC	96000 B	97500	99000 B	NA	NA	77000 B	NA	NA	4900 B	NA	NA	
NICKEL	NC	78	79.5	81	NA	NA	57	NA	NA	14 J	NA	NA	
POTASSIUM	NC	2200 JB	2150	2100 JB	NA	NA	2300 JB	NA	NA	3500 J	NA	NA	
SELENIUM	NC	18 J	18 J	50 U	NA	NA	50 U	NA	NA	5.6 J	NA	NA	
SILVER	NC	25 U	3.8 J	3.8 J	NA	NA	25 U	NA	NA	5 U	NA	NA	
SODIUM	NC	84000 B	83000	82000 B	NA	NA	120000 B	NA	NA	110000	NA	NA	
THALLIUM	NC	27 J	28.5	30 J	NA	NA	17 J	NA	NA	20 U	NA	NA	
VANADIUM	NC	7.6 J	9.3	11 J	NA	NA	7.3 J	NA	NA	50 U	NA	NA	
ZINC	NC	23 B	22.5	22 B	NA	NA	14 JB	NA	NA	20 U	NA	NA	

Table 3
Groundwater Analytical Results
Former Lyondell Beaver Valley Site
Potter Township, Pennsylvania

LOCATION:	PADEP Residential Used Aquifer MSC ⁽¹⁾	MW120	MW120	MW120	MW-120	MW-120	MW159	MW-159	MW-159	MW160	MW-160	MW-160	MW-160
SAMPLE ID:		MW120	MW120-AVG	MW120-D	MW-120	MW-120	MW159	MW-159	MW-159	MW160	MW-160	MW-160	MW-160
SAMPLE DATE:		20151109	20151109	20151109	20160620	20160816	20151110	20160621	20160815	20151111	20160620	20160815	
SAMPLE CODE:		ORIG	AVG	DUP	ORIG	ORIG							
MATRIX:		GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
SEMIVOLATILES (UG/L)													
1,1-BIPHENYL	1800	8.1 U	8.2 U	8.3 U	NA	NA	13	NA	NA	2 J	NA	NA	NA
2,4-DIMETHYLPHENOL	730	3.3 J	3.45	3.6 J	NA	NA	2.4 J	NA	NA	4.5 J	NA	NA	NA
2-METHYLNAPHTHALENE	150	1.6 U	1.65 U	1.7 U	NA	NA	1.2 J	NA	NA	1.7 U	NA	NA	NA
3&4-METHYLPHENOL	NC	3.1 J	3.2	3.3 J	NA	NA	2.7 J	NA	NA	2.6 J	NA	NA	NA
ACETOPHENONE	3700	16	16	16 J	NA	NA	14 J	NA	NA	19	NA	NA	NA
BENZALDEHYDE	NC	16 U	16.5 U	17 U	NA	NA	3.2 J	NA	NA	17 U	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	6	16 U	16.5 U	17 U	NA	NA	16 U	NA	NA	13 J	NA	NA	NA
DIETHYL PHTHALATE	29000	3.2 J	3.2 J	8.3 U	NA	NA	7.6 J	NA	NA	3 J	NA	NA	NA
FLUORENE	1500	1.6 U	1.65 U	1.7 U	NA	NA	3.1	NA	NA	0.66 J	NA	NA	NA
NAPHTHALENE	100	0.98 J	0.925	0.87 J	NA	NA	26	NA	NA	1.7 U	NA	NA	NA
PHENANTHRENE	1100	1.6 U	1.65 U	1.7 U	NA	NA	5.1	NA	NA	1.7 U	NA	NA	NA
PHENOL	2000	22	21	20	NA	NA	13	NA	NA	3.6 J	NA	NA	NA
VOLATILES (UG/L)													
BENZENE	5	4100	4000	3900	5 U	5 U	25000	53000	41000	770	5 U	2600	
ETHYLBENZENE	700	500 U	500 U	500 U	5 U	5 U	500 U	5000 U	2500 U	100 U	5 U	250 U	
TOLUENE	1000	500 U	500 U	500 U	5 U	5 U	500 U	5000 U	2500 U	100 U	5 U	250 U	
TOTAL XYLEMES	10000	1000 U	1000 U	1000 U	10 U	10 U	1000 U	10000 U	5000 U	200 U	10 U	500 U	

(1) Pennsylvania Act 2 Department of Environmental Protection's Statewide Health Standard, Residential, Used Aquifer, TDS ≤ 2500 Medium -Specific Concentration (MSC)

4100 =Exceeds MSC

ug/L = micrograms per liter

U = Below Reporting Limit

B = Detected in Method Blank

J = Estimated Result

F1 = Matrix spike recovery noncompliance

GW = Groundwater

ORIG = Original or Parent Sample

AVG = Average of Original and Duplicate Sample

DUP = Duplicate Sample

NA = Not Analyzed

NC = No Criteria

Table 3
Groundwater Analytical Results
Former Lyondell Beaver Valley Site
Potter Township, Pennsylvania

LOCATION:	PADEP Residential Used Aquifer MSC ⁽¹⁾	MW162	MW-162	MW-162	MW163S	MW-163S	MW-163S	MW501S	MW-501S	MW-501S	MW-501S	MW-501S	MW-501S	
SAMPLE ID:		MW162	MW-162	MW-162	MW163S	MW-163S	MW-163S	MW501S	MW-501S	MW-501S-AVG	MW-501S-D	MW-501S	MW-501S-AVG	MW-501S-D
SAMPLE DATE:		20151109	20160620	20160816	20151110	20160621	20160815	20151111	20160621	20160621	20160621	20160816	20160816	20160816
SAMPLE CODE:		ORIG	ORIG	Avg	DUP	ORIG	Avg	DUP						
MATRIX:	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
DISSOLVED METALS (UG/L)														
ALUMINUM	NC	200 U	200 U	80 J	6200	20000 B	7400	940000	850000 B	845000 B	840000 B	900000	890000	880000
ARSENIC	10	10 U	10 U	8.6 JB	10 U	20 U	28 B	50	32	29.5	27	160 B	160 B	160 B
BARIUM	2000	110 J	16 J	78 J	22 J	18 J	23 J	6.6 JB	400 U	400 U	400 U	4 J	3.85 J	3.7 J
BERYLLIUM	4	0.16 JB	4 U	4 U	1.7 J	3.6 J	1.7 J	43 B	40	40	40	36	35.5	35
CADMIUM	5	5 U	5 U	2.6 J	5 U	5 U	7.7	25 U	5.8	5.75 J	5.7 J	52	51.5	51
CALCIUM	NC	290000	33000	270000	120000 B	150000	140000	390000	340000	340000	340000	290000	285000	280000
CHROMIUM	100	1.6 J	5 U	5 U	40	110	57	380	340	340	340	290	290	290
COBALT	11	1.6 J	50 U	50 U	74	150	88	500	480	480	480	450	445	440
COPPER	1000	3.2 JB	25 U	3.8 J	25 U	25 U	25 U	220 B	200	200	200	210	210	210
IRON	NC	87000	190	84000	210000	330000	240000	1300000 B	1300000	1250000	1200000	1400000	1350000	1300000
LEAD	5	10 U	10 U	10 U	2.1 J	6.7 J	50 U	30 J	18 J	22.5 J	27 J	250 U	250 U	250 U
MAGNESIUM	NC	77000	25000	70000	26000	36000	29000	200000	180000	180000	180000	150000	150000	150000
MANGANESE	300	14000 B	160	13000	25000 B	31000	29000	21000 B	18000	18000	18000	17000	17000	17000
NICKEL	100	2.2 J	40 U	40 U	130	290	190	1300	1400	1350	1300	1300	1300	1300
POTASSIUM	NC	4800 JB	2900 J	5300	2100 JB	2600 J	2300 J	130000	110000	110000	110000	100000	100000	100000
SELENIUM	50	10 U	10 U	10 U	5.3 J	20 U	20 U	50 U	27	21.5 J	16 J	20	19.5 J	19 J
SILVER	100	5 U	5 U	5 U	5 U	10 U	10 U	25 U	10 U	10 U	10 U	5 U	5 U	5 U
SODIUM	NC	41000 B	28000	44000	78000 B	72000	73000	53000	50000	49500	49000	45000	44500	44000
THALLIUM	2	20 U	2.7 J	20 U	7.5 J	16 J	40 U	100 U	20 U	5 J	5 J	100 U	100 U	100 U
VANADIUM	260	50 U	50 U	50 U	5.5 J	24 J	50 U	830	1000	975	950	690	680	670
ZINC	2000	3.5 J	20 U	20 U	19 JB	14 J	12 J	3500 B	3000	3000	3000	2600	2550	2500
TOTAL METALS (UG/L)														
ALUMINUM	NC	130 J	NA	NA	7600	NA	NA	960000	NA	NA	NA	NA	NA	NA
ARSENIC	NC	10 U	NA	NA	10 U	NA	NA	32 J	NA	NA	NA	NA	NA	NA
BARIUM	NC	99 J	NA	NA	24 J	NA	NA	6.3 JB	NA	NA	NA	NA	NA	NA
BERYLLIUM	NC	4 U	NA	NA	1.8 J	NA	NA	44 B	NA	NA	NA	NA	NA	NA
CALCIUM	NC	270000 B	NA	NA	120000 B	NA	NA	400000	NA	NA	NA	NA	NA	NA
CHROMIUM	NC	5.2	NA	NA	44	NA	NA	390	NA	NA	NA	NA	NA	NA
COBALT	NC	0.91 J	NA	NA	69	NA	NA	510	NA	NA	NA	NA	NA	NA
COPPER	NC	1.9 J	NA	NA	25 U	NA	NA	230 B	NA	NA	NA	NA	NA	NA
IRON	NC	79000	NA	NA	200000	NA	NA	1300000 B	NA	NA	NA	NA	NA	NA
LEAD	NC	10 U	NA	NA	3.3 J	NA	NA	21 J	NA	NA	NA	NA	NA	NA
MAGNESIUM	NC	71000	NA	NA	26000	NA	NA	200000	NA	NA	NA	NA	NA	NA
MANGANESE	NC	12000 B	NA	NA	19000 B	NA	NA	21000 B	NA	NA	NA	NA	NA	NA
NICKEL	NC	1.8 J	NA	NA	120	NA	NA	1400	NA	NA	NA	NA	NA	NA
POTASSIUM	NC	4500 JB	NA	NA	2100 JB	NA	NA	130000	NA	NA	NA	NA	NA	NA
SELENIUM	NC	5.1 J	NA	NA	4 J	NA	NA	23 J	NA	NA	NA	NA	NA	NA
SILVER	NC	5 U	NA	NA	5 U	NA	NA	25 U	NA	NA	NA	NA	NA	NA
SODIUM	NC	40000 B	NA	NA	79000 B	NA	NA	54000	NA	NA	NA	NA	NA	NA
THALLIUM	NC	2.6 J	NA	NA	3.9 J	NA	NA	100 U	NA	NA	NA	NA	NA	NA
VANADIUM	NC	50 U	NA	NA	6.8 J	NA	NA	860	NA	NA	NA	NA	NA	NA
ZINC	NC	4.3 JB	NA	NA	13 JB	NA	NA	3600 B	NA	NA	NA	NA	NA	NA

Table 3
Groundwater Analytical Results
Former Lyondell Beaver Valley Site
Potter Township, Pennsylvania

LOCATION:	PADEP Residential Used Aquifer MSC ⁽¹⁾	MW162	MW-162	MW-162	MW163S	MW-163S	MW-163S	MW501S	MW-501S	MW-501S	MW-501S	MW-501S	MW-501S	MW-501S	
SAMPLE ID:		MW162	MW-162	MW-162	MW163S	MW-163S	MW-163S	MW501S	MW-501S	MW-501S-AVG	MW-501S-D	MW-501S	MW-501S-AVG	MW-501S-D	
SAMPLE DATE:		20151109	20160620	20160816	20151110	20160621	20160815	20151111	20160621	20160621	20160621	20160816	20160816	20160816	
SAMPLE CODE:		ORIG	Avg	DUP	ORIG	Avg	DUP								
MATRIX:	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	
SEMIVOLATILES (UG/L)															
1,1-BIPHENYL	1800	7.6 U	NA	NA	8.9 U	NA	NA	1.3 J	NA	NA	NA	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	730	2.9 J	NA	NA	8.9 U	NA	NA	5.2 J	NA	NA	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	150	1.5 U	NA	NA	1.8 U	NA	NA	1.8 U	NA	NA	NA	NA	NA	NA	NA
3&4-METHYLPHENOL	NC	7.6 U	NA	NA	8.9 U	NA	NA	8.9 U	NA	NA	NA	NA	NA	NA	NA
ACETOPHENONE	3700	9.5 J	NA	NA	1.8 J	NA	NA	610	NA	NA	NA	NA	NA	NA	NA
BENZALDEHYDE	NC	15 U	NA	NA	18 U	NA	NA	18 U	NA	NA	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	6	15 U	NA	NA	18 U	NA	NA	6.1 J	NA	NA	NA	NA	NA	NA	NA
DIETHYL PHTHALATE	29000	4.5 J	NA	NA	8.9 U	NA	NA	4 J	NA	NA	NA	NA	NA	NA	NA
FLUORENE	1500	1.5 U	NA	NA	1.8 U	NA	NA	1.8 U	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	100	3.7	NA	NA	2.4	NA	NA	20	NA	NA	NA	NA	NA	NA	NA
PHENANTHRENE	1100	1.5 U	NA	NA	1.8 U	NA	NA	1.8 U	NA	NA	NA	NA	NA	NA	NA
PHENOL	2000	150 F1	NA	NA	8.9 U	NA	NA	100	NA	NA	NA	NA	NA	NA	NA
VOLATILES (UG/L)															
BENZENE	5	16000	100 F1	29000	3000	5300	2000	95000	66000	69000	72000	55000	55500	56000	
ETHYLBENZENE	700	100 J	5 U	2500 U	500 U	500 U	5 U	420 J	5000 U	5000 U	5000 U	2500 U	2500 U	2500 U	
TOLUENE	1000	170 J	5 U	2500 U	500 U	500 U	5 U	1300	5000 U	5000 U	5000 U	2500 U	2500 U	2500 U	
TOTAL XYLEMES	10000	1000 U	10 U	5000 U	1000 U	1000 U	10 U	590 J	10000 U	10000 U	10000 U	5000 U	5000 U	5000 U	

(1) Pennsylvania Act 2 Department of Environmental Protection

4100 =Exceeds MSC

ug/L = micrograms per liter

U = Below Reporting Limit

B = Detected in Method Blank

J = Estimated Result

F1 = Matrix spike recovery noncompliance

GW = Groundwater

ORIG = Original or Parent Sample

AVG = Average of Original and Duplicate Sample

DUP = Duplicate Sample

NA = Not Analyzed

NC = No Criteria

Table 4
Surface Water Chemistry Field Measurements
August 2016 Sampling Event
Former Lyondell Beaver Valley Site
Potter Township, Pennsylvania

Well ID	Date	Temperature (°C) ⁽¹⁾	pH (SU) ⁽²⁾	Specific Conductivity (mS/cm) ⁽³⁾	Turbidity (NTUs) ⁽⁴⁾	DO (mg/L) ⁽⁶⁾
SW-01	08/18/16	22.79	7.50	0.889	59.4	6.09
SW-02	08/18/16	22.66	7.55	0.846	88.2	6.23
SW-03	08/18/16	22.83	7.70	0.842	71.3	5.45
SW-04	08/18/16	22.91	7.81	0.856	34.7	5.50
SW-05	08/18/16	23.07	7.77	0.929	42.70	5.95
SW-06	08/18/16	23.14	7.81	0.908	44.90	5.78
SW-07	08/18/16	23.21	7.93	0.882	30.40	5.29
SW-08	08/18/16	23.22	7.93	0.903	54.30	5.44
SW-09	08/18/16	23.28	7.96	0.889	35.80	5.22

Notes:

Field parameters measured at the conclusion of purging with a Horiba water quality instrument.

⁽¹⁾ °C = degrees celcius

⁽²⁾ SU = Standard Unit

⁽³⁾ mS/cm = millisiemens/centimeter

⁽⁴⁾ NTUs = Nephelometric Turbidity Units

⁽⁵⁾ mvolts = millivolts

⁽⁶⁾ mg/l = milligrams/liter

Table 5
Surface Water Analytical Results
Former Lyondell Beaver Valley Site
Potter Township, Pennsylvania

LOCATION SAMPLE ID SAMPLE DATE	PADEP Surface Water Ecological Standards (1)	PADEP Surface Water Human Health Standards (1)	SW-01 SW-01 20160818 UPSTREAM	SW-02 SW-02 20160818 UPSTREAM	SW-03 SW-03 20160818 UPSTREAM	SW-04 SW-04 20160818 PARENT	DUP-02 DUP-02 (SW-04) 20160818 DUP	SW-04 SW-04 20160818 AVG	SW-05 SW-05 20160818	SW-06 SW-06 20160818	SW-07 SW-07 20160818 DOWNSTREAM	SW-08 SW-08 20160818 DOWNSTREAM	SW-09 SW-09 20160818 DOWNSTREAM	
MATRIX														
Total Metals (ug/L)														
ALUMINUM	750	T	NC	820	370	370	290	270	280	210	370	250	590	97 J
ARSENIC	150	T	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ANTIMONY	220	T	5.6	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BARIUM	4100	T	2400	49 J	48 J	48 J	47 J	50 J	48.5 J	44 J	47 J	48 J	46 J	
BERYLLIUM	NC		NC	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
CADMIUM	0.25	D	NC	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CALCIUM	NC		NC	84000 B	83000 B	85000 B	87000 B	91000 B	89000 B	95000 B	95000 B	88000 B	87000 B	89000 B
CHROMIUM	74	D	NC	1.1 J	5 U	5 U	5 U	5 U	5 U	0.69 J	0.82 J	5 U	0.83 J	5 U
COBALT	15	T	NC	0.97 J	1.2 J	0.8 J	0.65 J	0.69 J	0.67 J	0.56 J	0.86 J	0.72 J	1.1 J	50 U
COPPER	9	D	NC	6.9 JB	6.2 JB	4.2 JB	6.1 JB	7.3 JB	6.7 JB	4 JB	4.8 JB	5 JB	5.4 JB	3.6 JB
IRON	1500	T	NC	1500	670	690	580	550	565	410	770	510	1200	140
LEAD	2.5	D	NC	4 J	4.5 J	3.4 J	10 U	3.8 J	10 U	3.4 J	4.1 J	3.9 J	10 U	
MAGNESIUM	NC		NC	28000	27000	28000	29000	31000	30000	27000	29000	29000	26000	30000
MANGANESE	1000	T	NC	120	140	98	110	104	88	97	100	160	27	
MERCURY	0.77	D	0.05	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	52	D	610	4.1 J	3.3 J	40 U	40 U	40 U	40 U	40 U	4.1 J	40 U	3.9 J	40 U
POTASSIUM	NC		NC	4300 J	4200 J	4200 J	4000 J	4400 J	4200 J	3800 J	4100 J	4000 J	4000 J	4000 J
SELENIUM	4.6	D	NC	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
SILVER	3.2	D	NC	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
SODIUM	NC		NC	37000 B	37000 B	38000 B	37000 B	39000 B	38000 B	40000 B	40000 B	37000 B	37000 B	37000 B
THALLIUM	13	T	0.24	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
VANADIUM	100	T	NC	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
ZINC	120	D	NC	23	22	18 J	15 J	18 J	16.5 J	14 J	17 J	16 J	27	20 U
Dissolved Metals (ug/L)														
ALUMINUM	750	T	NC	200 U	200 U	200 U	200 U	200 U	200 U	37 J	200 U	200 U	200 U	200 U
ARSENIC	150	T	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ANTIMONY	220	T	5.6	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BARIUM	4100	T	2400	43 J	46 J	48 J	47 J	44 J	45.5 J	45 J	47 J	50 J	44 J	44 J
BERYLLIUM	NC		NC	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
CADMIUM	0.25	D	NC	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CALCIUM	NC		NC	82000	87000	91000	89000	85000	87000	100000	100000	96000	91000	84000
CHROMIUM	74	D	NC	5 U	5 U	5 U	5 U	5 U	5 U	0.76 J	5 U	5 U	5 U	5 U
COBALT	15	T	NC	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	53 J	50 U
COPPER	9	D	NC	25 U	25 U	25 U	3.7 J	25 U	3.7 J	25 U	25 U	25 U	3.5 J	
IRON	1500	T	NC	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
LEAD	2.5	D	NC	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
MAGNESIUM	NC		NC	28000	29000	30000	30000	28000	29000	30000	32000	28000	28000	28000
MANGANESE	1000	T	NC	32	33	37	43	42	42.5	45	50	39	55	
MERCURY	0.77	D	0.05	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	52	D	610	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
POTASSIUM	NC		NC	4200 J	4400 J	4400 J	4200 J	3900 J	4050 J	4300 J	4400 J	4000 J	3800 J	
SELENIUM	4.6	D	NC	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
SILVER	3.2	D	NC	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
SODIUM	NC		NC	37000	39000	41000	37000	36000	36500	43000	42000	40000	39000	35000
THALLIUM	13	T	0.24	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
VANADIUM	100	T	NC	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
ZINC	120	D	NC	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Volatile Organics (ug/L)														
BENZENE	130	T	1.2	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYLBENZENE	580	T	530	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	330	T	1300	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL XYLEMES	210	T	7000	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

(1) Pennsylvania Department of Environmental Protection's Chapter 93 Surface Water Quality Standards, default screening value of 100 used for hardness

T = Criteria is based on total metal

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Table 6
Raccoon Creek Sediment Analytical Results
Former Lyondell Beaver Valley Site
Potter Township, Pennsylvania

LOCATION SAMPLE ID SAMPLE DATE MATRIX	Ecological Screening Value	Human Health Screening Value ⁽⁴⁾	SED-01 SED-01 20160818 UPSTREAM SD	SED-02 SED-02 20160818 PARENT SD	DUP-03 DUP SED-2 20160818 DUP SD	SED-02 SED-02 20160818 AVERAGE SD	SED-03 SED-03 20160818 SD
Inorganics (mg/Kg)							
ALUMINUM	25500 ⁽¹⁾	190000	10000	12000	12000	12000	8400
ANTIMONY	2 ⁽²⁾	88	1.3 U	1.4 U	1.5 U	1.45 U	1.3 U F1
ARSENIC	9.8 ⁽²⁾	12	9.8	9.1	17	13.05	11
BARIUM	130 ⁽¹⁾	44000	93	170	120	145	120
BERYLLIUM	NA	2	0.89	1.2	1.2	1.2	0.88
CADMIUM	0.99 ⁽²⁾	1.2	0.87	0.92	2.1	1.51	0.99
CALCIUM	NC ⁽³⁾	NA	2300	1600	1600	1600	1400
CHROMIUM	43.4 ⁽²⁾	190000	15	18	18	18	13
COBALT	50 ⁽²⁾	66	14	53	85	69	14
COPPER	31.6 ⁽²⁾	8100	17	19	22	20.5	20
IRON	20000 ⁽²⁾	150000	24000	25000	27000	26000	25000
LEAD	35.8 ⁽²⁾	500	16	14	17	15.5	19
MAGNESIUM	NC ⁽³⁾	NA	2500	2800	2800	2800	1900
MANGANESE	460 ⁽²⁾	10000	450	1000	1000	1000	380
MERCURY	0.18 ⁽²⁾	35	0.051 B	0.068	0.15 B	0.109	0.0075 B
NICKEL	22.7 ⁽²⁾	4400	26 J	65	63	64	23
POTASSIUM	NC ⁽³⁾	NA	1000	1100	1100	1100	870
SELENIUM	2 ⁽²⁾	1100	0.67 J	1.4 U	0.88 J	1.14	1.3 U
SILVER	1	1100	0.65 U	0.75 U	0.73 U	0.74 U	0.67 U
SODIUM	NC ⁽³⁾	NA	410 J	720 U	730 U	725 U	670 U
THALLIUM	NA	2	2.6 U	2.9 U	2.9 U	2.9 U	2.7 U
VANADIUM	57 ⁽¹⁾	15	19	24	23	23.5	18
ZINC	121 ⁽²⁾	66000	82	89	180	134.5	70
Volatile Organics (mg/Kg)							
BENZENE	NA	57	0.0065 U	0.0076 U	0.0073 U	0.00745 U	0.0055 U F1
ETHYLBENZENE	1.1 ⁽²⁾	180	0.0065 U	0.0076 U	0.0073 U	0.00745 U	0.0055 U F1
TOULENE	NA	10000	0.0065 U	0.0076 U	0.0073 U	0.00745 U	0.0055 U F1
TOTAL XYLENES	NA	1900	0.013 U	0.015 U	0.015 U	0.015 U	0.011 U F1

(1) NOAA Squirt Freshwater Screening Value

(2) EPA BTAG Region 3 Screening Values - Freshwater Sediment

(3) NC - Not of concern considered essential nutrient

(4) Pennsylvania DEP Act 2 Statewide Health Standard; Residential; Direct Contact (0'-15') Medium-Specific Concentration (MSC)

NA = No Screening Value Available

mg/kg = milligrams per kilogram

U = Below Reporting Limit

J = Estimated Result

B = Compound was found in the blank and sample

F1 = MS and/or MSD recovery is outside of acceptance limits

Exceeds Human Health Screening Value

Exceeds Ecological Screening Value

730

SD = Sediment

Original = Parent Sample

DUP = Duplicate Sample

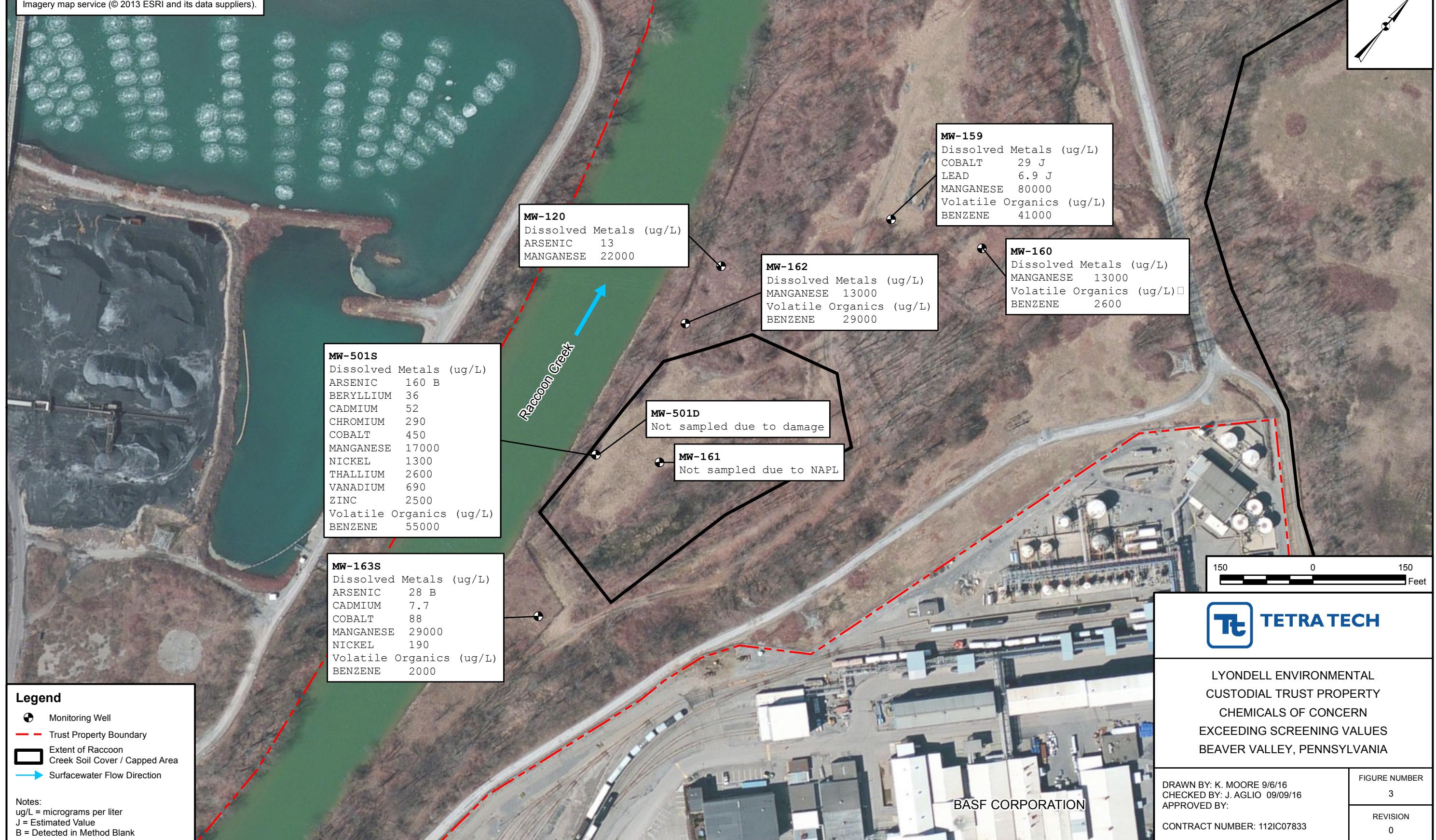
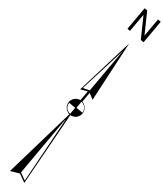
AVG = Average of Parent and Duplicate Sample

FIGURES





Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2013 ESRI and its data suppliers).



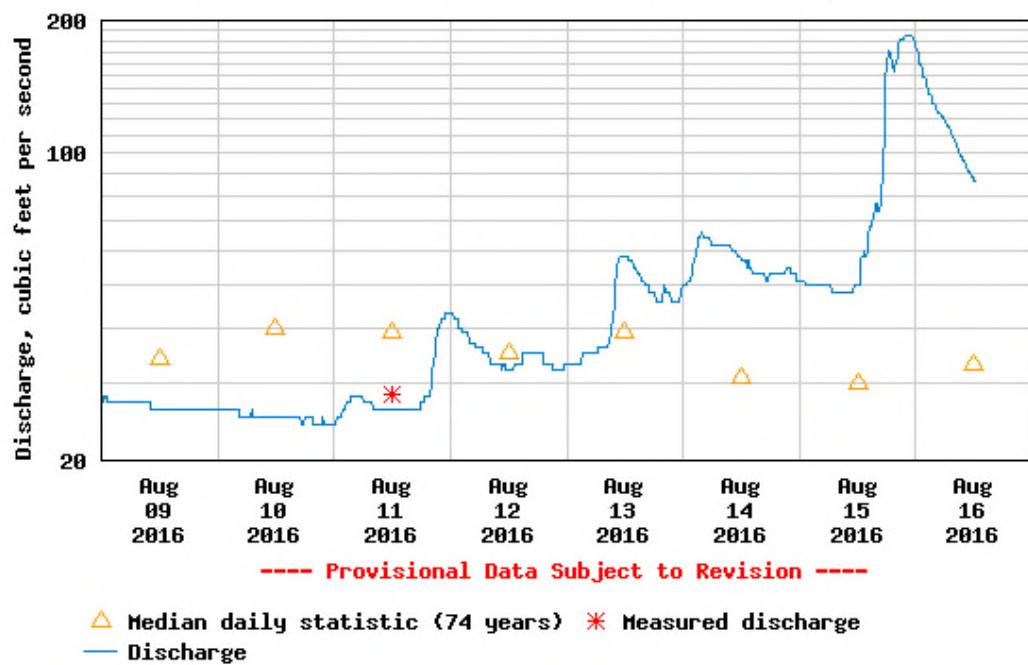




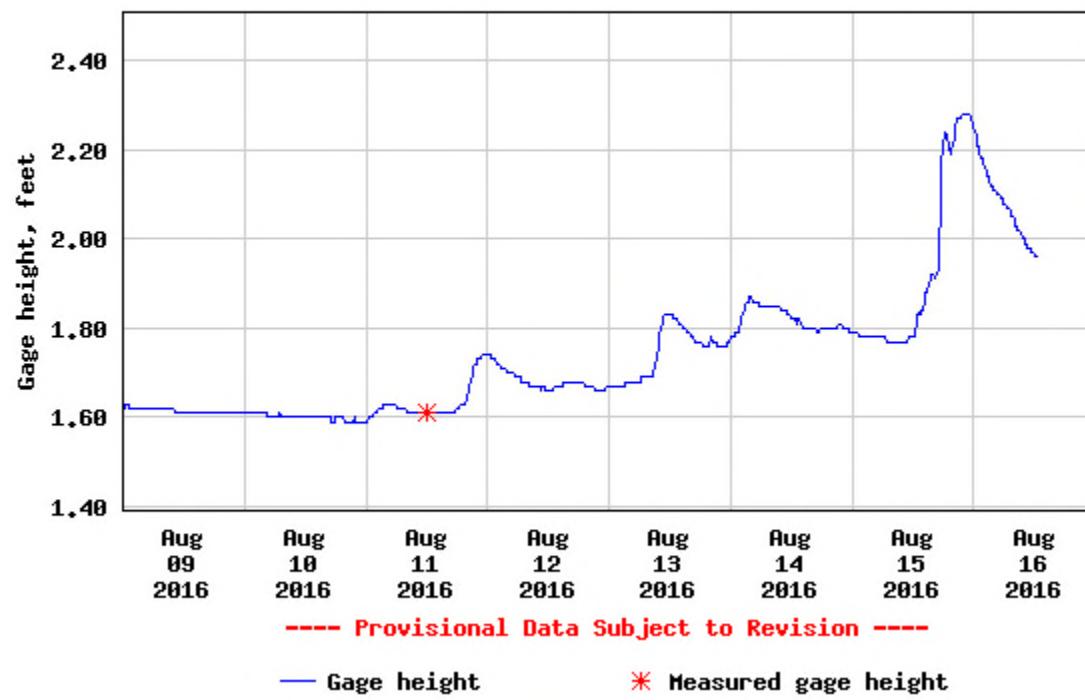
ATTACHMENT 1
USGS STAFF GAUGE SUMMARY



USGS 03108000 Raccoon Creek at Moffatts Mill, PA

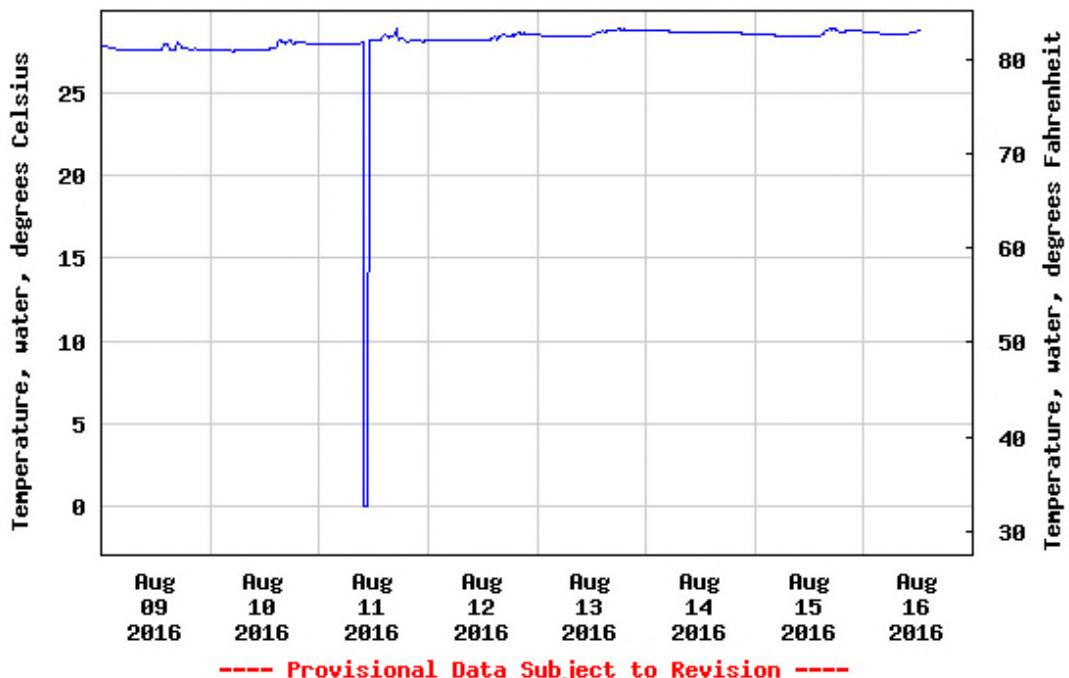


USGS 03108000 Raccoon Creek at Moffatts Mill, PA

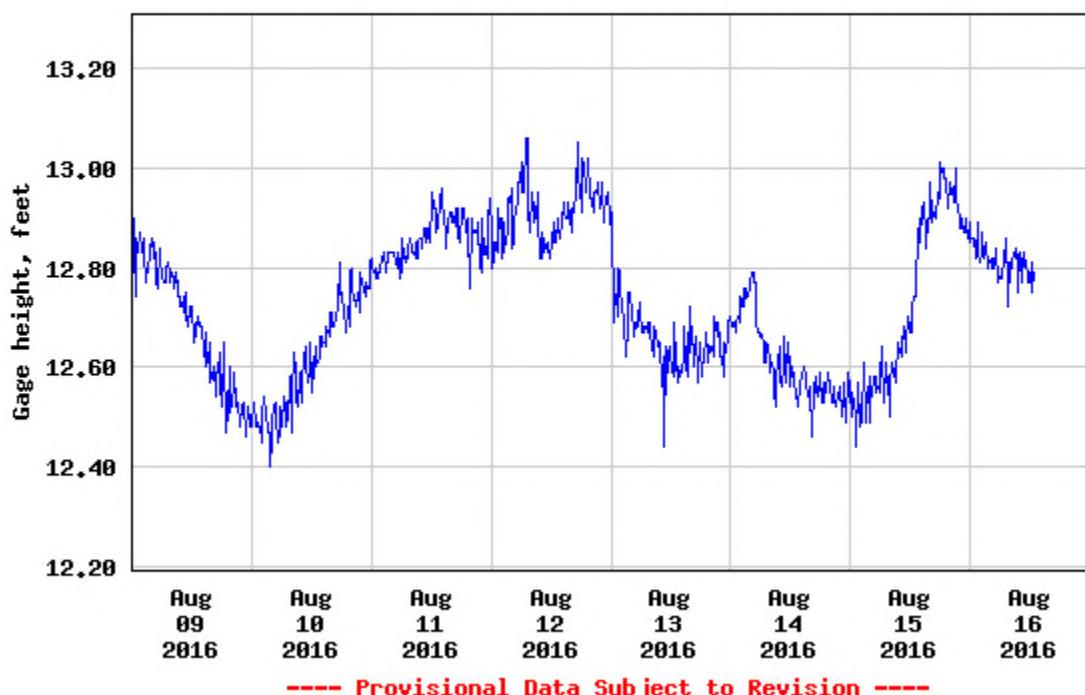




USGS 03108490 Ohio R ab Montgomery Dam & Locks at Ohioview, PA



USGS 03108490 Ohio R ab Montgomery Dam & Locks at Ohioview, PA

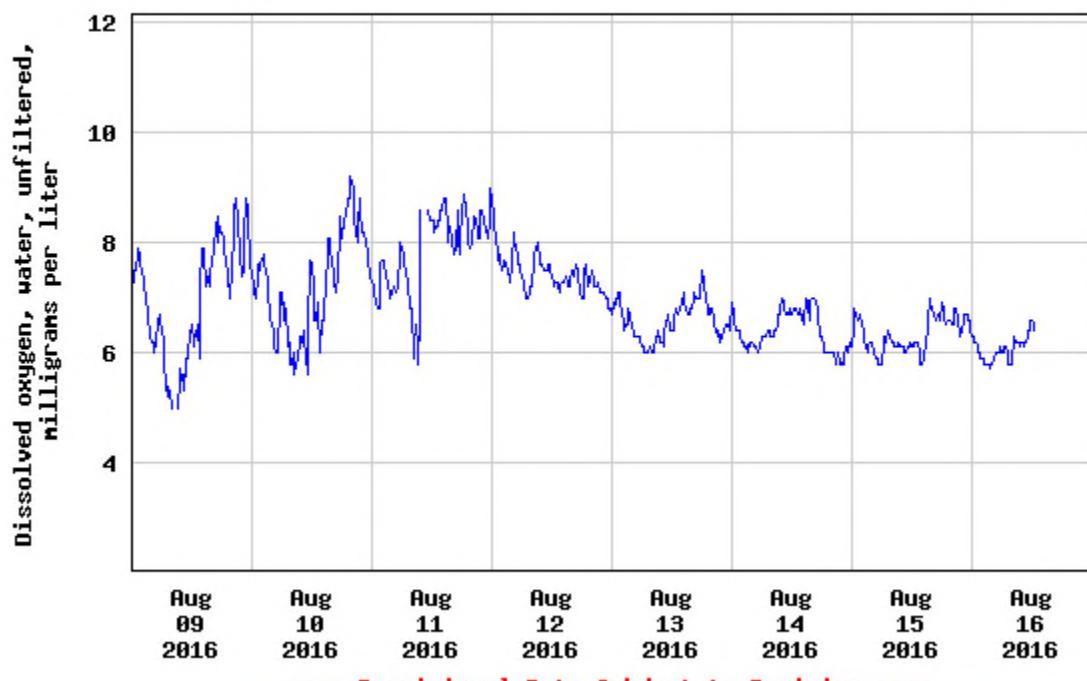




USGS 03108490 Ohio R ab Montgomery Dam & Locks at Ohiovie, PA

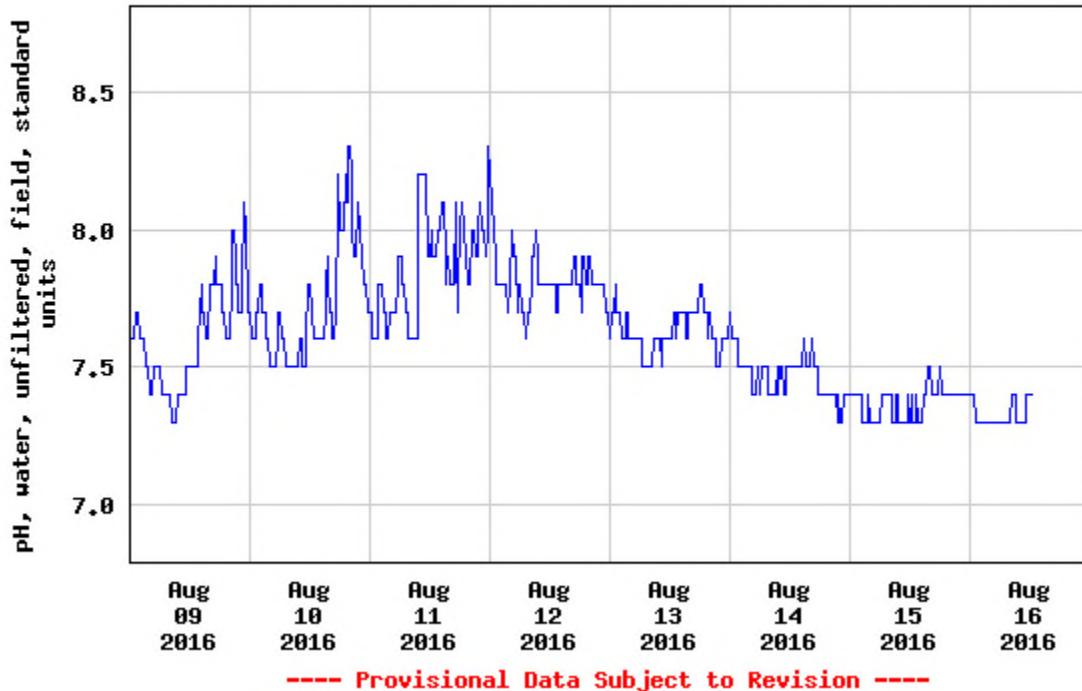


USGS 03108490 Ohio R ab Montgomery Dam & Locks at Ohiovie, PA



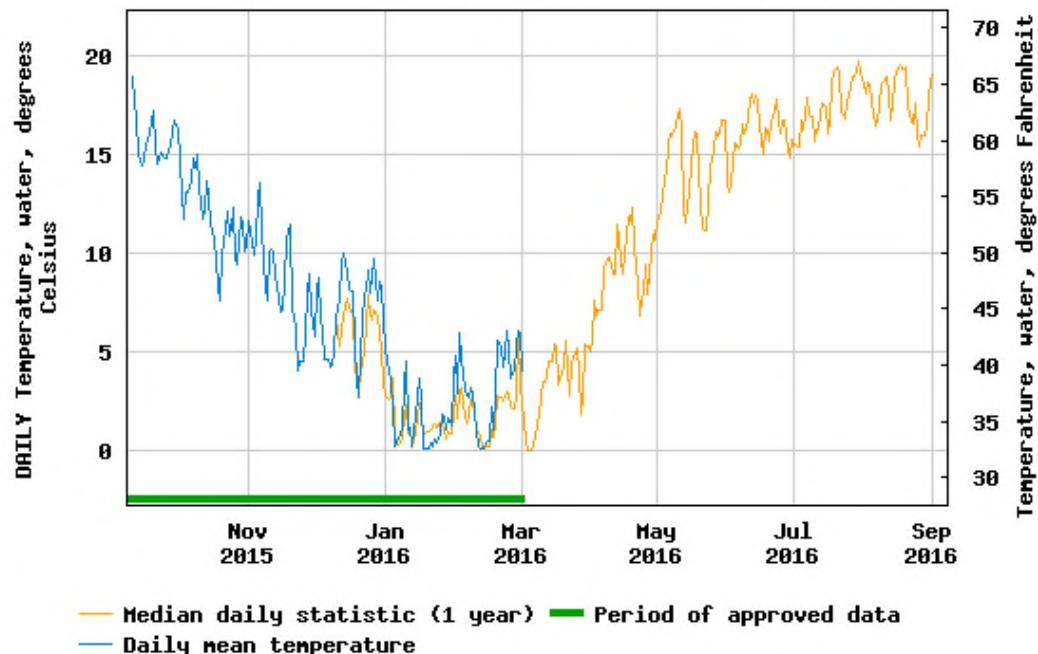


USGS 03108490 Ohio R ab Montgomery Dam & Locks at Ohiovie, PA

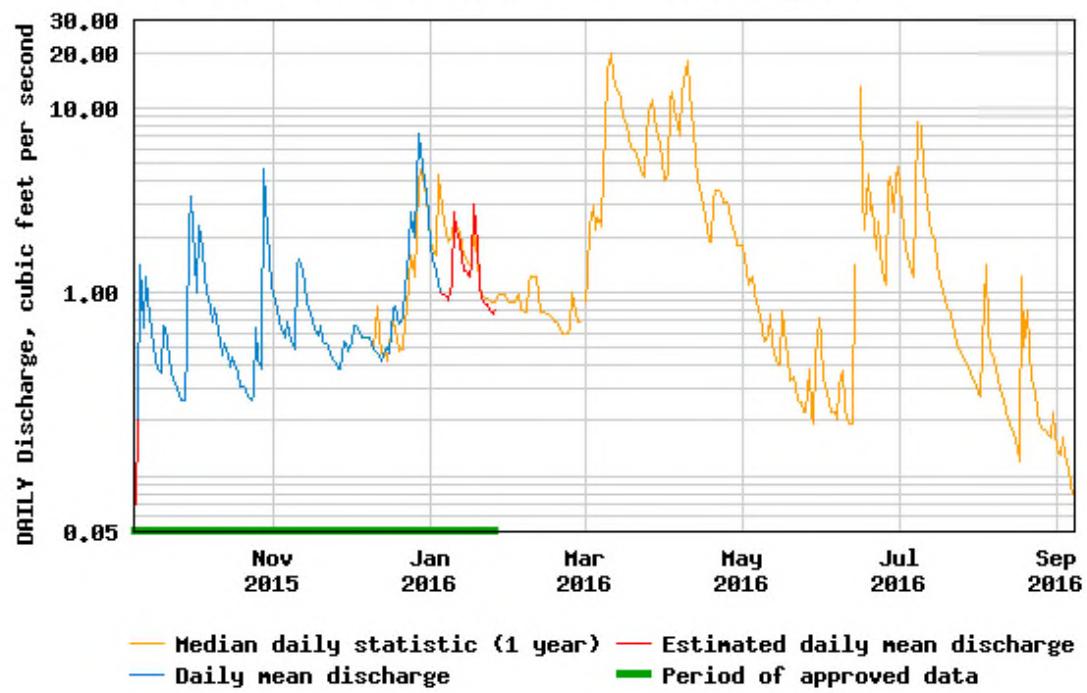




USGS 03108010 Fishpot Run near Shippingport, PA



USGS 03108010 Fishpot Run near Shippingport, PA



ATTACHMENT 2
FIELD DATA SHEETS



Tetra Tech

GROUNDWATER SAMPLE LOG SHEET

Page 1 of 2

Project Site Name: Project No.:	<u>Lyonell - Beaver Valley</u> <u>112ICU7823</u>				Sample ID No.: <u>MW-170</u>			
<input type="checkbox"/> Domestic Well Data <input checked="" type="checkbox"/> Monitoring Well Data <input type="checkbox"/> Other Well Type: <input type="checkbox"/> QA Sample Type:					Sample Location: Sampled By: <u>M. Simcock</u> C.O.C. No.: Type of Sample: <input type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration			
SAMPLING DATA:								
Date: <u>8-16-16</u>	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%) <u>ppt</u>	Other <u>ORP</u>
Time: <u>0905</u>		<u>7.26</u>	<u>1.34</u>	<u>14.95</u>	<u>0.0</u>	<u>0.40</u>	<u>0.7</u>	<u>-184</u>
PURGE DATA:								
Date: <u>8-16-16</u>	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method: <u>Low Flow</u>								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: <u>4" Steel</u>								
Total Well Depth (TD): <u>46.63</u>								
Static Water Level (WL): <u>25.84</u>								
One Casing Volume(gal/L): <u>51.35</u>								
Start Purge (hrs): <u>0820</u>								
End Purge (hrs): <u>0905</u>								
Total Purge Time (min): <u>45</u>								
Total Vol. Purged (gal): <u>9.45</u>								
SAMPLE COLLECTION INFORMATION:								
Analysis	Preservative	Container Requirements				Collected		
<u>BTEX</u>	<u>HCl</u>	<u>13</u>				<u>✓</u>		
<u>D.S. Mptcls</u>	<u>HNO3</u>	<u>1</u>				<u>✓</u>		
OBSERVATIONS / NOTES:								
<u>46.63-25.84 = 20.79</u> <u>20.79 / 2.47</u> <u>51.35 liters per 1-volume</u>				<u>MS/MSD collected</u>				
Circle if Applicable:					Signature(s):			
MS/MSD <u>Yes</u>	Duplicate ID No.: <u>—</u>			<u>WS</u>				



PROJECT SITE NAME:
Loudell - Beaver Valley

PROJECT NUMBER:
11d TCO7833

LOW FLOW PURGE DATA SHEET

WELL ID.: MW-120
DATE: 8-16-16

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP mV	Salinity % or ppt	Comments
0830	25.84	350	6.77	1,33	0.0	1.45	14.46	-146	0.2	Method used for Turbidity
0835	26.36	350	6.95	1.32	0.0	0.65	14.82	-159	0.2	" "
0830	26.57	250	7.06	1.31	0.0	0.53	14.83	-165	0.6	" "
0835	26.86	"	7.11	1.30	0.0	0.49	14.70	-170	0.6	" "
0840	27.01	"	7.15	1.31	0.0	0.44	14.79	-174	0.7	" "
0845	27.29	"	7.18	1.32	0.0	0.42	14.22	-127	0.7	" "
0850	27.53	"	7.21	1.33	0.0	0.52	14.89	-180	0.7	" "
0855	27.57	"	7.23	1.34	0.0	0.43	14.87	-181	0.7	" "
0900	27.71	"	7.24	1.34	0.0	0.40	14.92	-182	0.7	" "
0905	27.82	"	7.26	1.34	0.0	0.40	14.95	-184	0.7	" "
	Samples @ 0905									

SIGNATURE(S): HSC

Handwritten
VE 89VNU
HANNA NOT USED
Humidistat
Not being used.



Tetra Tech

GROUNDWATER SAMPLE LOG SHEET

Page 1 of 2

Project Site Name:	<u>Former Beaver Valley</u>				Sample ID No.:	<u>MW-159</u>		
Project No.:	<u>11dI07833</u>				Sample Location:			
<input type="checkbox"/> Domestic Well Data					Sampled By:	<u>M. Simsek</u>		
<input checked="" type="checkbox"/> Monitoring Well Data					C.O.C. No.:			
<input type="checkbox"/> Other Well Type:					Type of Sample:			
<input type="checkbox"/> QA Sample Type:					<input type="checkbox"/> Low Concentration			
SAMPLING DATA:								
Date: <u>8-15-16</u>	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Time: <u>0845</u>		<u>6.12</u>	<u>2.03</u>	<u>14.30</u>	<u>12.6</u>	<u>0.75</u>	<u>1.0</u>	<u>-84</u>
PURGE DATA:								
Date: <u>8-15-16</u>	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method: <u>Lou Flow</u>								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: <u>4" Steel</u>								
Total Well Depth (TD): <u>54.27</u>								
Static Water Level (WL): <u>25.81</u>								
One Casing Volume(gal/l): <u>70.29</u>								
Start Purge (hrs): <u>0740</u>								
End Purge (hrs): <u>0845</u>								
Total Purge Time (min): <u>65</u>								
Total Vol. Purged (gal/l): <u>17.86</u>								
SAMPLE COLLECTION INFORMATION:								
Analysis	Preservative	Container Requirements				Collected		
<u>BTEX</u>	<u>HCl</u>	<u>3</u>				<u>✓</u>		
<u>Trace Metals</u>	<u>HNO3</u>	<u>1</u>				<u>✓</u>		
OBSERVATIONS / NOTES:								
<u>54.27 - 25.81 = 28.46 · 2.47 = (70.29 Liters)</u>								
Circle if Applicable:					Signature(s): <u>[Signature]</u>			
MS/MSD	Duplicate ID No.:							
<u>—</u>	<u>—</u>							



PROJECT SITE NAME:
PROJECT NUMBER:

b7c b7d - Belvoir Univex
118-TC07833

WELL ID.:
DATE:

LOW FLOW PURGE DATA SHEET

MW-159

SIGNATURE(S): 



Tetra Tech

GROUNDWATER SAMPLE LOG SHEET

Page 1 of 2

Project Site Name:	Lyondell - Beaver Valley		Sample ID No.:	MW-160	
Project No.:	11d-F07833		Sample Location:		
<input type="checkbox"/> Domestic Well Data			Sampled By:	M. Smak	
<input checked="" type="checkbox"/> Monitoring Well Data			C.O.C. No.:		
<input type="checkbox"/> Other Well Type:			Type of Sample:		
<input type="checkbox"/> QA Sample Type:			<input type="checkbox"/> Low Concentration		
			<input type="checkbox"/> High Concentration		
SAMPLING DATA:					
Date: 8-15-16	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)
Time: 1025					DO (mg/l)
Method: Low Flow	Clear	6.61	1.52	13.81	0.0
					Salinity (%)
					Other 6RP
PURGE DATA:					
Date: 8-15-16	Volume	pH	S.C.	Temp.	Turbidity
Method: Low Flow					DO
Monitor Reading (ppm):					Salinity
Well Casing Diameter & Material					Other
Type: 4" Steel					
Total Well Depth (TD): 47.78					
Static Water Level (WL): 17.52					
One Casing Volume(gal/L): 74.74					
Start Purge (hrs): 0920					
End Purge (hrs): 1625					
Total Purge Time (min): 65					
Total Vol. Purged (gal/L): 21.2					
SAMPLE COLLECTION INFORMATION:					
Analysis	Preservative	Container Requirements			Collected
BTEX	HCL	3			✓
DIS. Metals	HNO3	1			✓
OBSERVATIONS / NOTES:					
47.78 - 17.52 = 30.26 * 2.47 = 74.74 Liters					
Circle if Applicable:			Signature(s):		
MS/MSD	Duplicate ID No.:				
	—				



LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME:
Lynndell - Beaver Valley
PROJECT NUMBER:
11d EC 072833

WELL ID.: MW-160
DATE:

Batch - SWN * - UC89V44U

Time (Hrs.)	Water Level (Ft below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppb	Comments
0935	17.57	325	6.56	1.54	0.0	0.85	14.36	-113	0.8	USGS Harbor Test
0930	17.54	"	6.54	1.58	0.0	0.71	13.96	-117	0.8	Turbidity
0935	17.53	"	6.55	1.57	0.0	0.59	13.89	-121	0.8	
0940	17.54	"	6.61	1.56	0.0	0.54	13.86	-126	0.8	
0945	17.54	"	6.57	1.55	0.0	0.53	13.92	-127	0.8	
0950	17.55	"	6.62	1.54	0.0	0.72	13.91	-130	0.8	
0955	17.56	"	6.58	1.54	0.0	0.51	13.86	-132	0.8	
1000	17.57	"	6.60	1.53	0.0	0.56	13.86	-133	0.8	
1005	17.56	"	6.64	1.53	0.0	0.47	13.90	-135	0.8	
1010	17.55	"	6.60	1.53	0.0	0.46	13.89	-139	0.8	
1015	17.56	"	6.60	1.53	0.0	0.47	13.83	-139	0.8	
1020	17.55	"	6.61	1.52	0.0	0.50	13.81	-140	0.8	

SIGNATURE(S): K. S.



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GROUNDWATER SAMPLE LOG SHEET

Page 1 of 2



PROJECT SITE NAME:
Lindell - Beaver Valley

PROJECT NUMBER:
11a.Ic07833

LOW FLOW PURGE DATA SHEET

WELL ID.: MU-162
DATE: 0-16-16

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP mV	Salinity ‰ or ppt	Comments
0925	22.44	300								
0930	22.46	"	6.95	1.91	4.9	0.52	16.08	-121	1.0	
0935	22.47	"	6.91	1.94	0.0	0.37	15.46	-129	1.0	
0940	22.49	"	6.90	1.94	0.0	0.35	15.35	-132	1.0	
0945	22.49	"	6.90	1.94	0.0	0.34	15.31	-133	1.0	
0950	22.49	"	6.90	1.95	0.0	0.33	15.25	-134	1.0	
0955	22.49	"	6.90	1.95	0.0	0.32	15.21	-135	1.0	
1000	22.49	"	6.89	1.96	0.0	0.40	15.01	-135	1.0	
1005	22.49	"	6.90	1.96	0.0	0.34	15.16	-136	1.0	
1010	22.49	"	6.89	1.96	0.0	0.31	15.13	-136	1.0	

SIGNATURE(S):

Hornbeam SN# : VE89V44U

- Hornbeam not used Hornbeam marker
- including conductivity on new
- water used for turbidity



Tetra Tech

GROUNDWATER SAMPLE LOG SHEET

Page 1 of 2

Project Site Name:	<u>Lyndell - Beaver Valley</u>				Sample ID No.:	<u>MW-1635</u>		
Project No.:	<u>1121607833</u>				Sample Location:			
<input type="checkbox"/> Domestic Well Data					Sampled By:	<u>M. Simak</u>		
<input checked="" type="checkbox"/> Monitoring Well Data					C.O.C. No.:			
<input type="checkbox"/> Other Well Type:					Type of Sample:			
<input type="checkbox"/> QA Sample Type:					<input type="checkbox"/> Low Concentration			
SAMPLING DATA:								
Date: <u>8-15-16</u>	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. °C	Turbidity (NTU)	DO (mg/l)	Salinity (%) <u>21</u>	Other <u>ORP</u>
Time: <u>1145</u>								
Method: <u>Low Flow</u>	<u>clear w/yellow tint</u>	<u>5.01</u>	<u>1.87</u>	<u>15.43</u>	<u>117</u>	<u>0.37</u>	<u>0.9</u>	<u>-7</u>
PURGE DATA:								
Date: <u>8-15-16</u>	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method: <u>Low Flow</u>								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: <u>4" Steel</u>								
Total Well Depth (TD): <u>33.58</u>								
Static Water Level (WL): <u>7.82</u>								
One Casing Volume(gal/L): <u>63.63</u>								
Start Purge (hrs): <u>1045</u>								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								
SAMPLE COLLECTION INFORMATION:								
Analysis	Preservative	Container Requirements				Collected		
<u>BTEX</u>	<u>HCl</u>	<u>4 3</u>				<u>✓</u>		
<u>Diss Metals</u>	<u>HNO₃</u>	<u>1</u>				<u>✓</u>		
OBSERVATIONS / NOTES:								
<u>33.58 - 7.82 = 25.76 ÷ 2.47 = 63.63(L)</u>						<u>- collected Field Blank</u> <u>FB-01</u> <u>8-15-16/1100</u>		
Circle if Applicable:						Signature(s):		
MS/MSD	Duplicate ID No.:							



PROJECT SITE NAME:
Lyonell - Bear Valley

PROJECT NUMBER:
112507833

WELL ID.:
MW-163

DATE:
8-15-16

LOW FLOW PURGE DATA SHEET

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP mV	Salinity % or ppt	Comments
1045	7.87	325	5.11	2.36	261	0.72	16.12	43	1.3	High Turb
1050	7.83	11	4.70	2.44	231	0.67	16.09	43	1.2	Lower pH
1055	7.71	11	4.66	2.47	205	0.53	15.95	39	1.2	
1100	7.65	11	4.63	2.37	186	0.50	15.80	44	1.2	
1115	7.69	11	4.66	2.32	164	0.47	15.76	29	1.2	
1120	7.71	11	4.69	2.36	154	0.44	15.99	26	1.2	
1125	7.68	11	4.88	2.08	133	0.51	15.50	10	1.1	
1130	7.70	11	4.92	2.02	130	0.41	15.53	6	1.0	
1135	7.71	11	5.01	1.95	125	0.38	15.40	0	1.0	$\rho_h = 4.98$
1140	7.70	11	4.99	1.90	120	0.37	15.47	-4	1.0	
1145	7.69	11	5.01	1.87	117	0.37	15.42	-7	0.9	Sampled

Horiba SN# = VEG99440
Horiba used for turbidity due
to water bubbles throwing off
HANNA

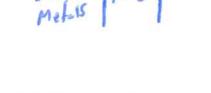
SIGNATURE(S): ES



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GROUNDWATER SAMPLE LOG SHEET

Page 1 of 2

Project Site Name:	Lyonsville - Beaver Valley		Sample ID No.:	MW-5015	
Project No.:	112 ICo 7233		Sample Location:		
<input type="checkbox"/> Domestic Well Data			Sampled By:	<u>M. Simcock</u>	
<input checked="" type="checkbox"/> Monitoring Well Data			C.O.C. No.:		
<input type="checkbox"/> Other Well Type:			Type of Sample:		
<input type="checkbox"/> QA Sample Type:			<input type="checkbox"/> Low Concentration		
<input type="checkbox"/> High Concentration					
SAMPLING DATA:					
Date: <u>8-16-16</u>	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)
Time: <u>0712 755</u>	<u>Yellow Tint</u>	<u>2.74</u>	<u>8.90</u>	<u>14.05</u>	<u>9.32</u>
Method: <u>Low Flow</u>					<u>0.43</u>
Salinity (%) <u>4.9</u>	DO (mg/l)				Other <u>ORP 189</u>
PURGE DATA:					
Date: <u>8-16-16</u>	Volume	pH	S.C.	Temp.	Turbidity
Method: <u>Low Flow</u>					
Monitor Reading (ppm):					
Well Casing Diameter & Material					
Type: <u>2" Pvc</u>					
Total Well Depth (TD): <u>42.56</u>					
Static Water Level (WL): <u>17.82</u>					
One Casing Volume(gal): <u>15.26</u>					
Start Purge (hrs): <u>0710</u>					
End Purge (hrs): <u>0755</u>					
Total Purge Time (min): <u>45</u>					
Total Vol. Purged (gal): <u>13.5</u>					
SAMPLE COLLECTION INFORMATION:					
Analysis	Preservative	Container Requirements			Collected
BTEX	HCl	3			✓
Dis. Metals	HNO ₃	1			✓
OBSERVATIONS / NOTES:					
<u>42.56 - 17.82 = 24.74 - 0.617 = 15.26 liters</u>			collected Dup-01		
			BTEX HCl 3		
			DIS HNO ₃ 1		
			time / Date 0000 / 8-16-16		
Circle if Applicable:			Signature(s):		
MS/MSD	Duplicate ID No.:				
-	Dup-01				



PROJECT SITE NAME:
Lydell - Bear Valley

PROJECT NUMBER:
112-1107033

LOW FLOW PURGE DATA SHEET

WELL ID.: MW - 501-5
DATE: 8-16-16

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP mV	Salinity % or ppt	Comments
0710	17.82	300	2.93	830	554	0.94	15.33	194	4.6	Low pH, High cond / Normal (low) Turbidity
0715	18.50	"	2.81	8.62	664	0.65	14.63	192	4.8	Normal used for turbidity
0720	18.59	"	2.72	8.23	12.3	0.53	14.74	191	4.8	Normal used for turbidity
0725	18.59	"	2.78	8.25	20.7	0.56	14.06	190	4.9	"
0730	18.61	"	2.28	8.25	9.45	0.53	14.03	189	4.9	"
0735	18.62	"	2.76	8.80	7.53	0.75	14.06	189	4.9	"
0740	18.63	"	2.78	8.81	14.5	0.46	14.06	189	4.9	"
0745	18.63	"	2.78	8.77	10.2	0.44	14.03	188	4.9	"
0750	18.65	"	2.79	8.90	18.8	0.42	13.95	188	4.9	"
0755	18.66	"	2.79	8.90	9.32	0.43	14.05	189	4.9	Simplified Yellow Tint
										over

Horizon SN# : VEG89V444
Log Date : 169116X



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SURFACE WATER SAMPLE LOG SHEET

Page ___ of ___

Project Site Name:
Project No.:

Lyonell - Beaver Valley
121007837

Sample ID No.: SIN-1
Sample Location: SIN-1
Sampled By: JA
C.O.C. No.: —

- Stream
 - Spring
 - Pond
 - Lake
 - Other: _____
 - QA Sample Type: _____

Type of Sample:

- Low Concentration
- High Concentration

SAMPLING DATA:

Date:	8-18-16	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Time:	740								
Depth:	—	Cloudy							
Method:	—	clear	7.50	0.889	22.79	59.4	6.09	—	—

SAMPLE COLLECTION INFORMATION:

OBSERVATIONS / NOTES:

MAP:

OBSERVATIONS/NOTES	MMW

Circle if Applicable:

Signature(s):

MS/MSD

Duplicate ID No.:

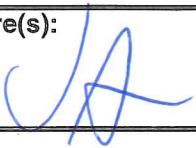
ture(s):



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SURFACE WATER SAMPLE LOG SHEET

Page ____ of ____

Project Site Name:	Loudell - Beaver Valley 112IC07833			Sample ID No.:	SW-2			
Project No.:				Sample Location:	SW-2			
<input checked="" type="checkbox"/> Stream				Sampled By:	JA			
<input type="checkbox"/> Spring				C.O.C. No.:	-			
<input type="checkbox"/> Pond				Type of Sample:				
<input type="checkbox"/> Lake				<input type="checkbox"/> Low Concentration				
<input type="checkbox"/> Other:				<input type="checkbox"/> High Concentration				
<input type="checkbox"/> QA Sample Type:								
SAMPLING DATA:								
Date: 8-18-10	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Time: 746								
Depth: —	Clear	7.55	0.846	22.66	88.2	6.23	—	—
Method: —	Cloudy							
SAMPLE COLLECTION INFORMATION:								
Analysis	Preservative	Container Requirements				Collected		
BTEX	HCl	3 VOA				<input checked="" type="checkbox"/>		
Total / Diss. metals	HNO ₃	2-450mL				<input checked="" type="checkbox"/>		
OBSERVATIONS / NOTES:				MAP:				
Circle if Applicable:				Signature(s): 				
MS/MSD	Duplicate ID No.:							



Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Page ____ of ____

Project Site Name: Lyondell Beaumarshall
Project No.: 112 FCO 7833

Sample ID No.: Sw-3
Sample Location: Sw-3
Sampled By: JA
C.O.C. No.: -

- Stream
 Spring
 Pond
 Lake
 Other: _____
 QA Sample Type:

Type of Sample:

- Low Concentration
- High Concentration

SAMPLING DATA:

SAMPLE COLLECTION INFORMATION:

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

Signature(s):

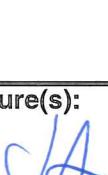
MS/MSD **Duplicate ID No.:**



Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Page ___ of ___

Project Site Name:	Loudell Beaver Valley		Sample ID No.:	SW-4	
Project No.:	117IC07833		Sample Location:	SW-4	
<input checked="" type="checkbox"/> Stream			Sampled By:	VA	
<input type="checkbox"/> Spring			C.O.C. No.:	-	
<input type="checkbox"/> Pond					
<input type="checkbox"/> Lake					
<input type="checkbox"/> Other:					
<input type="checkbox"/> QA Sample Type:					
SAMPLING DATA:					
Date: 8-18-16	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	
Time: 806					
Depth: -	Clear	7.81	0.856	22.91	
Method: -	Cloudy				
SAMPLE COLLECTION INFORMATION:					
Analysis	Preservative	Container Requirements			Collected
BTEX	HCl	3 vials			<input checked="" type="checkbox"/>
Total / Diss. metals	1tNog	3 - 150mL			<input checked="" type="checkbox"/>
OBSERVATIONS / NOTES:			MAP:		
Circle if Applicable:			Signature(s):		
MS/MSD	Duplicate ID No.:	PUP-02			



Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Page _____ of _____

Project Site Name:
Project No.:

Guadalupe Valley
112507833

Sample ID No.:

Sheet 5

Sample Location:

sw-5

Sampled By

1

Stream

- Spring
 - Pond
 - Lake
 - Other: _____
 - QA Sample Type:

Type of Sample:

- Low Concentration
 - High Concentration

SAMPLING DATA:

SAMPLE COLLECTION INFORMATION:

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

Signature(s):

MS/MSD

Duplicate ID No.:

1

1



Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Page ____ of ____

Project Site Name: Project No.:	<u>Lyndell Beaver Valley</u> <u>[11IC07833]</u>				Sample ID No.: <u>SW-6</u>	Sample Location: <u>SW-6</u>	Sampled By: <u>-</u>	C.O.C. No.: <u>-</u>
<input checked="" type="checkbox"/> Stream <input type="checkbox"/> Spring <input type="checkbox"/> Pond <input type="checkbox"/> Lake <input type="checkbox"/> Other: _____ <input type="checkbox"/> QA Sample Type: _____	Type of Sample: <input type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration							
SAMPLING DATA:								
Date: <u>8-18-16</u>	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Time: <u>812</u>								
Depth: <u>-</u>	<u>Clear/Cloudy</u>	<u>7.87</u>	<u>0.908</u>	<u>23.04</u>	<u>40.9</u>	<u>5.78</u>	<u>-</u>	<u>-</u>
SAMPLE COLLECTION INFORMATION:								
Analysis	Preservative	Container Requirements				Collected		
BTEX	HCl	3 vials				<input checked="" type="checkbox"/>		
Total Diss. Metals	HgCl ₂	2-450 mL				<input checked="" type="checkbox"/>		
OBSERVATIONS / NOTES:				MAP:				
Circle if Applicable:				Signature(s): <u>GJ</u>				
MS/MSD <u>-</u>	Duplicate ID No.: <u>-</u>							



Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Page _____ of _____

Project Site Name:
Project No.:

Lyndell Beaver Valley
112 IC07833

Sample ID No.:

5w-7

Sample Location:

5w-7

Sampled By

1

- Stream
 - Spring
 - Pond
 - Lake
 - Other:
 - QA Sample Type:

Type of Sample:

- Low Concentration
 - High Concentration

SAMPLING DATA:

SAMPLE COLLECTION INFORMATION:

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

Signature(s):

MS/MSD

Duplicate ID No.:

1

1



Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Page ____ of ____

Project Site Name:
Project No.:

Liondell Beaver Valley
118 ICO 7833

Sample ID No.: Sw-

Sw-8

Sample Location: Sw-8

Sampled By: JL

- Stream
 - Spring
 - Pond
 - Lake
 - Other: _____
 - QA Sample Type: _____

Type of Sample:

- Low Concentration
 - High Concentration

SAMPLING DATA:

Date:	8-18-16	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Time:	8:33								
Depth:	—	clear							
Method:	—	cloudy	7.93	0.903	23.22	54.3	5.44	—	—

SAMPLE COLLECTION INFORMATION:

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

Signature(s):

MS/MSD

Duplicate ID No.:

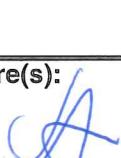
[Signature]



Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Page _____ of _____

Project Site Name:	<u>Lynchell River Valley</u>				Sample ID No.:	SW-9			
Project No.:	<u>112 ICO 7833</u>				Sample Location:	SW-9			
<input checked="" type="checkbox"/> Stream					Sampled By:	VA			
<input type="checkbox"/> Spring					C.O.C. No.:	—			
<input type="checkbox"/> Pond					Type of Sample:				
<input type="checkbox"/> Lake					<input type="checkbox"/> Low Concentration				
<input type="checkbox"/> Other:					<input type="checkbox"/> High Concentration				
<input type="checkbox"/> QA Sample Type:									
SAMPLING DATA:									
Date: <u>8-18-16</u>	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other	
Time: <u>8:35</u>									
Depth: <u>—</u>									
Method: <u>—</u>	<u>Cloudy</u>	<u>7.96</u>	<u>0.889</u>	<u>23.28</u>	<u>35.8</u>	<u>5.22</u>	<u>—</u>	<u>—</u>	
SAMPLE COLLECTION INFORMATION:									
Analysis	Preservative	Container Requirements				Collected			
<u>BTEX</u> <u>Total Diss. metals</u>	<u>HCl</u> <u>HNO3</u>	<u>3 vials</u> <u>2-75ml</u>				<input checked="" type="checkbox"/>			
OBSERVATIONS / NOTES:					MAP:				
Circle if Applicable:									Signature(s):
MS/MSD	Duplicate ID No.:								
<u>—</u>	<u>—</u>								

ATTACHMENT 3
TESTAMERICA ANALYTICAL REPORT

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Pittsburgh

301 Alpha Drive

RIDC Park

Pittsburgh, PA 15238

Tel: (412)963-7058

TestAmerica Job ID: 180-57673-1

Client Project/Site: Lyondell Beaver Valley Plant Groundwater

For:

Tetra Tech, Inc.

Foster Plaza 7

661 Anderson Drive

Pittsburgh, Pennsylvania 15220-2745

Attn: Mr. Jonathon Aglio



Authorized for release by:

8/29/2016 4:17:21 PM

Jill Colussy, Project Manager I

(412)963-2444

jill.colussy@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Job ID: 180-57673-1

Laboratory: TestAmerica Pittsburgh

Narrative

Job Narrative 180-57673-1

Receipt

The samples were received on 8/17/2016 3:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.4° C.

The laboratory received three of three VOA vials with head-space for the following samples: MW-159, MW-501S, DUP-01, MW-120, MW-120, MW-120, and MW-162.

The laboratory received one of three VOAs vials with head-space for sample MW-160.

The chain of custody listed dissolved metals. The sample containers listed total metals in 250-ml nitric preserved bottle. The client was contacted and the samples were filtered in the field. The dissolved labels were not placed on the containers (250-ml plastic-nitric preserved-dissolved).

GC/MS VOA

The following sample was diluted to bring the concentration of target analytes within the calibration range: MW-163 (180-57673-4), MW-159 (180-57673-1), MW-160 (180-57673-2), MW-501S (180-57673-5), DUP-01 (180-57673-6) and MW-162 (180-57673-8). Elevated reporting limits (RLs) are provided.

Metals

Sample MW-163 (180-57673-4) was less than the negative reporting limit for lead and required dilution.

The following samples were diluted to bring the concentration of aluminum to within the instrument's linear range: MW-501S (180-57673-5) and DUP-01 (180-57673-6) as well as the analytes associated with its IEC; antimony & selenium. Elevated reporting limits (RLs) are provided.

The following samples were diluted to bring the concentration of iron to within the instrument's linear range: MW-501S (180-57673-5) and DUP-01 (180-57673-6) as well as the analytes associated with its IEC; arsenic, cadmium and thallium. Elevated reporting limits (RLs) are provided.

The following samples were diluted to bring the concentration of manganese to within the instrument's linear range: MW-159 (180-57673-1) and MW-163 (180-57673-4) as well as the analytes associated with its IEC; silver, chromium, selenium and thallium. Elevated reporting limits (RLs) are provided.

Sample MW-501S (180-57673-5) and DUP-01 (180-57673-6) was less than the negative reporting limit for lead and required dilution.

The post digestion spike of sample MW-120 (180-57673-7) was outside of the control limits for mercury.

Definitions/Glossary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.
F1	MS and/or MSD Recovery is outside acceptance limits.
F2	MS/MSD RPD exceeds control limits
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation

These commonly used abbreviations may or may not be present in this report.

☒	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Certification Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Laboratory: TestAmerica Pittsburgh

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Pennsylvania	NELAP	3	02-00416	04-30-17

1

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Sample Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-57673-1	MW-159	Water	08/15/16 08:45	08/17/16 15:30
180-57673-2	MW-160	Water	08/15/16 10:25	08/17/16 15:30
180-57673-3	FB-01	Water	08/15/16 11:00	08/17/16 15:30
180-57673-4	MW-163	Water	08/15/16 11:45	08/17/16 15:30
180-57673-5	MW-501S	Water	08/16/16 07:55	08/17/16 15:30
180-57673-6	DUP-01	Water	08/16/16 00:00	08/17/16 15:30
180-57673-7	MW-120	Water	08/16/16 09:05	08/17/16 15:30
180-57673-8	MW-162	Water	08/16/16 10:10	08/17/16 15:30

Method Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	TAL PIT
6010C	Metals (ICP)	SW846	TAL PIT
7470A	Mercury (CVAA)	SW846	TAL PIT

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Client Sample ID: MW-159

Date Collected: 08/15/16 08:45

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C Instrument ID: CHHP7		500	5 mL	5 mL	186016	08/25/16 13:06	PJJ	TAL PIT
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C Instrument ID: Q		1			185755	08/23/16 08:40	RJR	TAL PIT
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C Instrument ID: Q		5			185787	08/23/16 12:22	RJR	TAL PIT
Dissolved	Prep	7470A			50 mL	50 mL	185286	08/18/16 08:52	EVR	TAL PIT
Dissolved	Analysis	7470A Instrument ID: K		1			185374	08/18/16 14:38	EVR	TAL PIT

Client Sample ID: MW-160

Date Collected: 08/15/16 10:25

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C Instrument ID: CHHP7		50	5 mL	5 mL	186016	08/25/16 16:27	PJJ	TAL PIT
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C Instrument ID: Q		1			185755	08/23/16 08:34	RJR	TAL PIT
Dissolved	Prep	7470A			50 mL	50 mL	185286	08/18/16 08:52	EVR	TAL PIT
Dissolved	Analysis	7470A Instrument ID: K		1			185374	08/18/16 14:40	EVR	TAL PIT

Client Sample ID: FB-01

Date Collected: 08/15/16 11:00

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C Instrument ID: CHHP4		1	5 mL	5 mL	185934	08/24/16 11:35	PJJ	TAL PIT
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C Instrument ID: Q		1			185755	08/23/16 08:29	RJR	TAL PIT
Dissolved	Prep	7470A			50 mL	50 mL	185286	08/18/16 08:52	EVR	TAL PIT
Dissolved	Analysis	7470A Instrument ID: K		1			185374	08/18/16 14:41	EVR	TAL PIT

Lab Chronicle

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Client Sample ID: MW-163

Date Collected: 08/15/16 11:45

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	185934	08/24/16 13:39	PJJ	TAL PIT
		Instrument ID: CHHP4								
Total/NA	Analysis	8260C	DL	10	5 mL	5 mL	185934	08/24/16 18:44	PJJ	TAL PIT
		Instrument ID: CHHP4								
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C		1			185755	08/23/16 08:13	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C		2			185787	08/23/16 12:11	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C		5			185787	08/23/16 12:17	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185286	08/18/16 08:52	EVR	TAL PIT
Dissolved	Analysis	7470A		1			185374	08/18/16 14:43	EVR	TAL PIT
		Instrument ID: K								

Client Sample ID: MW-501S

Date Collected: 08/16/16 07:55

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		500	5 mL	5 mL	186016	08/25/16 15:53	PJJ	TAL PIT
		Instrument ID: CHHP7								
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C		1			185755	08/23/16 08:08	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C		2			185787	08/23/16 11:56	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C		5			185787	08/23/16 12:06	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C		25			185837	08/23/16 17:38	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185286	08/18/16 08:52	EVR	TAL PIT
Dissolved	Analysis	7470A		1			185374	08/18/16 14:45	EVR	TAL PIT
		Instrument ID: K								

TestAmerica Pittsburgh

Lab Chronicle

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Client Sample ID: DUP-01

Date Collected: 08/16/16 00:00

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		500	5 mL	5 mL	186016	08/25/16 14:48	PJJ	TAL PIT
		Instrument ID: CHHP7								
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C		1			185755	08/23/16 08:03	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C		2			185787	08/23/16 11:50	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C		5			185787	08/23/16 12:01	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C		25			185837	08/23/16 17:33	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185286	08/18/16 08:52	EVR	TAL PIT
Dissolved	Analysis	7470A		1			185374	08/18/16 14:47	EVR	TAL PIT
		Instrument ID: K								

Client Sample ID: MW-120

Date Collected: 08/16/16 09:05

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	185934	08/24/16 11:09	PJJ	TAL PIT
		Instrument ID: CHHP4								
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C		1			185755	08/23/16 07:37	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185286	08/18/16 08:52	EVR	TAL PIT
Dissolved	Analysis	7470A		1			185374	08/18/16 14:49	EVR	TAL PIT
		Instrument ID: K								

Client Sample ID: MW-162

Date Collected: 08/16/16 10:10

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-8

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		500	5 mL	5 mL	186016	08/25/16 15:18	PJJ	TAL PIT
		Instrument ID: CHHP7								
Dissolved	Prep	3005A			50 mL	50 mL	185268	08/18/16 07:33	ANA	TAL PIT
Dissolved	Analysis	6010C		1			185755	08/23/16 07:57	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185286	08/18/16 08:52	EVR	TAL PIT

TestAmerica Pittsburgh

Lab Chronicle

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Client Sample ID: MW-162

Date Collected: 08/16/16 10:10

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-8

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	7470A		1			185374	08/18/16 14:59	EVR	TAL PIT

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Analyst References:

Lab: TAL PIT

Batch Type: Prep

ANA = Alexis Anderson

EVR = Emilie Reichenbach

Batch Type: Analysis

EVR = Emilie Reichenbach

PJJ = Patrick Journet

RJR = Ron Rosenbaum

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Client Sample ID: MW-159

Date Collected: 08/15/16 08:45

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-1

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	41000		2500	1500	ug/L			08/25/16 13:06	500
Toluene	ND		2500	1800	ug/L			08/25/16 13:06	500
Ethylbenzene	ND		2500	1000	ug/L			08/25/16 13:06	500
Xylenes, Total	ND		5000	2300	ug/L			08/25/16 13:06	500
m-Xylene & p-Xylene	ND		2500	970	ug/L			08/25/16 13:06	500
o-Xylene	ND		2500	1500	ug/L			08/25/16 13:06	500
Surrogate		%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	93			62 - 123				08/25/16 13:06	500
4-Bromofluorobenzene (Surr)	102			75 - 120				08/25/16 13:06	500
Dibromofluoromethane (Surr)	118			80 - 120				08/25/16 13:06	500
Toluene-d8 (Surr)	98			80 - 120				08/25/16 13:06	500

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		25	5.8	ug/L			08/18/16 07:33	08/23/16 12:22
Aluminum	56 J		200	37	ug/L			08/18/16 07:33	08/23/16 08:40
Arsenic	ND		10	4.8	ug/L			08/18/16 07:33	08/23/16 08:40
Antimony	ND		10	3.2	ug/L			08/18/16 07:33	08/23/16 08:40
Barium	30 J		200	3.2	ug/L			08/18/16 07:33	08/23/16 08:40
Beryllium	ND		4.0	0.42	ug/L			08/18/16 07:33	08/23/16 08:40
Cadmium	1.2 J		5.0	0.20	ug/L			08/18/16 07:33	08/23/16 08:40
Calcium	240000		5000	89	ug/L			08/18/16 07:33	08/23/16 08:40
Chromium	ND		25	3.0	ug/L			08/18/16 07:33	08/23/16 12:22
Cobalt	29 J		50	0.51	ug/L			08/18/16 07:33	08/23/16 08:40
Copper	3.7 J		25	3.4	ug/L			08/18/16 07:33	08/23/16 08:40
Iron	38000		100	41	ug/L			08/18/16 07:33	08/23/16 08:40
Lead	6.9 J		10	3.1	ug/L			08/18/16 07:33	08/23/16 08:40
Magnesium	46000		5000	79	ug/L			08/18/16 07:33	08/23/16 08:40
Manganese	80000		75	5.7	ug/L			08/18/16 07:33	08/23/16 12:22
Nickel	58		40	3.2	ug/L			08/18/16 07:33	08/23/16 08:40
Potassium	2400 J		5000	620	ug/L			08/18/16 07:33	08/23/16 08:40
Selenium	ND		50	19	ug/L			08/18/16 07:33	08/23/16 12:22
Sodium	130000		5000	190	ug/L			08/18/16 07:33	08/23/16 08:40
Thallium	ND		100	13	ug/L			08/18/16 07:33	08/23/16 12:22
Vanadium	ND		50	6.9	ug/L			08/18/16 07:33	08/23/16 08:40
Zinc	24		20	6.9	ug/L			08/18/16 07:33	08/23/16 08:40

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L			08/18/16 08:52	08/18/16 14:38

Client Sample ID: MW-160

Date Collected: 08/15/16 10:25

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-2

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	2600		250	150	ug/L			08/25/16 16:27	50
Toluene	ND		250	180	ug/L			08/25/16 16:27	50

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Client Sample ID: MW-160

Date Collected: 08/15/16 10:25

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-2

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		250	100	ug/L			08/25/16 16:27	50
Xylenes, Total	ND		500	230	ug/L			08/25/16 16:27	50
m-Xylene & p-Xylene	ND		250	97	ug/L			08/25/16 16:27	50
o-Xylene	ND		250	150	ug/L			08/25/16 16:27	50
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	93		62 - 123					08/25/16 16:27	50
4-Bromofluorobenzene (Surr)	95		75 - 120					08/25/16 16:27	50
Dibromofluoromethane (Surr)	106		80 - 120					08/25/16 16:27	50
Toluene-d8 (Surr)	93		80 - 120					08/25/16 16:27	50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L			08/18/16 07:33	08/23/16 08:34
Aluminum	ND		200	37	ug/L			08/18/16 07:33	08/23/16 08:34
Arsenic	ND		10	4.8	ug/L			08/18/16 07:33	08/23/16 08:34
Antimony	ND		10	3.2	ug/L			08/18/16 07:33	08/23/16 08:34
Barium	65 J		200	3.2	ug/L			08/18/16 07:33	08/23/16 08:34
Beryllium	ND		4.0	0.42	ug/L			08/18/16 07:33	08/23/16 08:34
Cadmium	0.98 J		5.0	0.20	ug/L			08/18/16 07:33	08/23/16 08:34
Calcium	130000		5000	89	ug/L			08/18/16 07:33	08/23/16 08:34
Chromium	ND		5.0	0.61	ug/L			08/18/16 07:33	08/23/16 08:34
Cobalt	ND		50	0.51	ug/L			08/18/16 07:33	08/23/16 08:34
Copper	ND		25	3.4	ug/L			08/18/16 07:33	08/23/16 08:34
Iron	36000		100	41	ug/L			08/18/16 07:33	08/23/16 08:34
Lead	ND		10	3.1	ug/L			08/18/16 07:33	08/23/16 08:34
Magnesium	29000		5000	79	ug/L			08/18/16 07:33	08/23/16 08:34
Manganese	6200		15	1.1	ug/L			08/18/16 07:33	08/23/16 08:34
Nickel	16 J		40	3.2	ug/L			08/18/16 07:33	08/23/16 08:34
Potassium	2700 J		5000	620	ug/L			08/18/16 07:33	08/23/16 08:34
Selenium	ND		10	3.8	ug/L			08/18/16 07:33	08/23/16 08:34
Sodium	150000		5000	190	ug/L			08/18/16 07:33	08/23/16 08:34
Thallium	ND		20	2.6	ug/L			08/18/16 07:33	08/23/16 08:34
Vanadium	ND		50	6.9	ug/L			08/18/16 07:33	08/23/16 08:34
Zinc	ND		20	6.9	ug/L			08/18/16 07:33	08/23/16 08:34

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L			08/18/16 08:52	08/18/16 14:40

Client Sample ID: FB-01

Date Collected: 08/15/16 11:00

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-3

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/24/16 11:35	1
Toluene	ND		5.0	3.6	ug/L			08/24/16 11:35	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/24/16 11:35	1
Xylenes, Total	ND		10	4.6	ug/L			08/24/16 11:35	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Client Sample ID: FB-01

Date Collected: 08/15/16 11:00

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-3

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/24/16 11:35	1
o-Xylene	ND		5.0	2.9	ug/L			08/24/16 11:35	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	88		62 - 123					08/24/16 11:35	1
4-Bromofluorobenzene (Surr)	92		75 - 120					08/24/16 11:35	1
Dibromofluoromethane (Surr)	94		80 - 120					08/24/16 11:35	1
Toluene-d8 (Surr)	108		80 - 120					08/24/16 11:35	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L			08/18/16 07:33	08/23/16 08:29
Aluminum	ND		200	37	ug/L			08/18/16 07:33	08/23/16 08:29
Arsenic	ND		10	4.8	ug/L			08/18/16 07:33	08/23/16 08:29
Antimony	ND		10	3.2	ug/L			08/18/16 07:33	08/23/16 08:29
Barium	ND		200	3.2	ug/L			08/18/16 07:33	08/23/16 08:29
Beryllium	ND		4.0	0.42	ug/L			08/18/16 07:33	08/23/16 08:29
Cadmium	ND		5.0	0.20	ug/L			08/18/16 07:33	08/23/16 08:29
Calcium	ND		5000	89	ug/L			08/18/16 07:33	08/23/16 08:29
Chromium	ND		5.0	0.61	ug/L			08/18/16 07:33	08/23/16 08:29
Cobalt	ND		50	0.51	ug/L			08/18/16 07:33	08/23/16 08:29
Copper	ND		25	3.4	ug/L			08/18/16 07:33	08/23/16 08:29
Iron	ND		100	41	ug/L			08/18/16 07:33	08/23/16 08:29
Lead	ND		10	3.1	ug/L			08/18/16 07:33	08/23/16 08:29
Magnesium	ND		5000	79	ug/L			08/18/16 07:33	08/23/16 08:29
Manganese	ND		15	1.1	ug/L			08/18/16 07:33	08/23/16 08:29
Nickel	ND		40	3.2	ug/L			08/18/16 07:33	08/23/16 08:29
Potassium	ND		5000	620	ug/L			08/18/16 07:33	08/23/16 08:29
Selenium	ND		10	3.8	ug/L			08/18/16 07:33	08/23/16 08:29
Sodium	ND		5000	190	ug/L			08/18/16 07:33	08/23/16 08:29
Thallium	ND		20	2.6	ug/L			08/18/16 07:33	08/23/16 08:29
Vanadium	ND		50	6.9	ug/L			08/18/16 07:33	08/23/16 08:29
Zinc	13 J		20	6.9	ug/L			08/18/16 07:33	08/23/16 08:29

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L			08/18/16 08:52	08/18/16 14:41

Client Sample ID: MW-163

Date Collected: 08/15/16 11:45

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-4

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toluene	ND		5.0	3.6	ug/L			08/24/16 13:39	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/24/16 13:39	1
Xylenes, Total	ND		10	4.6	ug/L			08/24/16 13:39	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/24/16 13:39	1
o-Xylene	4.1 J		5.0	2.9	ug/L			08/24/16 13:39	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Client Sample ID: MW-163

Date Collected: 08/15/16 11:45

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-4

Matrix: Water

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	72		62 - 123		08/24/16 13:39	1
4-Bromofluorobenzene (Surr)	93		75 - 120		08/24/16 13:39	1
Dibromofluoromethane (Surr)	89		80 - 120		08/24/16 13:39	1
Toluene-d8 (Surr)	99		80 - 120		08/24/16 13:39	1

Method: 8260C - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	2000		50	30	ug/L			08/24/16 18:44	10
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	96		62 - 123					08/24/16 18:44	10
4-Bromofluorobenzene (Surr)	99		75 - 120					08/24/16 18:44	10
Dibromofluoromethane (Surr)	101		80 - 120					08/24/16 18:44	10
Toluene-d8 (Surr)	109		80 - 120					08/24/16 18:44	10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		10	2.3	ug/L		08/18/16 07:33	08/23/16 12:11	2
Aluminum	7400		200	37	ug/L		08/18/16 07:33	08/23/16 08:13	1
Arsenic	28 B		10	4.8	ug/L		08/18/16 07:33	08/23/16 08:13	1
Antimony	ND		10	3.2	ug/L		08/18/16 07:33	08/23/16 08:13	1
Barium	23 J		200	3.2	ug/L		08/18/16 07:33	08/23/16 08:13	1
Beryllium	1.7 J		4.0	0.42	ug/L		08/18/16 07:33	08/23/16 08:13	1
Cadmium	7.7		5.0	0.20	ug/L		08/18/16 07:33	08/23/16 08:13	1
Calcium	140000		5000	89	ug/L		08/18/16 07:33	08/23/16 08:13	1
Chromium	57		10	1.2	ug/L		08/18/16 07:33	08/23/16 12:11	2
Cobalt	88		50	0.51	ug/L		08/18/16 07:33	08/23/16 08:13	1
Copper	ND		25	3.4	ug/L		08/18/16 07:33	08/23/16 08:13	1
Iron	240000		100	41	ug/L		08/18/16 07:33	08/23/16 08:13	1
Lead	ND		50	15	ug/L		08/18/16 07:33	08/23/16 12:17	5
Magnesium	29000		5000	79	ug/L		08/18/16 07:33	08/23/16 08:13	1
Manganese	29000		30	2.3	ug/L		08/18/16 07:33	08/23/16 12:11	2
Nickel	190		40	3.2	ug/L		08/18/16 07:33	08/23/16 08:13	1
Potassium	2300 J		5000	620	ug/L		08/18/16 07:33	08/23/16 08:13	1
Selenium	ND		20	7.5	ug/L		08/18/16 07:33	08/23/16 12:11	2
Sodium	73000		5000	190	ug/L		08/18/16 07:33	08/23/16 08:13	1
Thallium	ND		40	5.3	ug/L		08/18/16 07:33	08/23/16 12:11	2
Vanadium	ND		50	6.9	ug/L		08/18/16 07:33	08/23/16 08:13	1
Zinc	12 J		20	6.9	ug/L		08/18/16 07:33	08/23/16 08:13	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/18/16 08:52	08/18/16 14:43	1

Client Sample ID: MW-501S

Date Collected: 08/16/16 07:55

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-5

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	55000		2500	1500	ug/L			08/25/16 15:53	500

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Client Sample ID: MW-501S

Date Collected: 08/16/16 07:55

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-5

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toluene	ND		2500	1800	ug/L			08/25/16 15:53	500
Ethylbenzene	ND		2500	1000	ug/L			08/25/16 15:53	500
Xylenes, Total	ND		5000	2300	ug/L			08/25/16 15:53	500
m-Xylene & p-Xylene	ND		2500	970	ug/L			08/25/16 15:53	500
o-Xylene	ND		2500	1500	ug/L			08/25/16 15:53	500
Surrogate	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	85			62 - 123				08/25/16 15:53	500
4-Bromofluorobenzene (Surr)	95			75 - 120				08/25/16 15:53	500
Dibromofluoromethane (Surr)	106			80 - 120				08/25/16 15:53	500
Toluene-d8 (Surr)	93			80 - 120				08/25/16 15:53	500

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/18/16 07:33	08/23/16 08:08	1
Aluminum	900000		400	74	ug/L		08/18/16 07:33	08/23/16 11:56	2
Arsenic	160 B		50	24	ug/L		08/18/16 07:33	08/23/16 12:06	5
Antimony	ND		20	6.4	ug/L		08/18/16 07:33	08/23/16 11:56	2
Barium	4.0 J		200	3.2	ug/L		08/18/16 07:33	08/23/16 08:08	1
Beryllium	36		4.0	0.42	ug/L		08/18/16 07:33	08/23/16 08:08	1
Cadmium	52		25	0.98	ug/L		08/18/16 07:33	08/23/16 12:06	5
Calcium	290000		5000	89	ug/L		08/18/16 07:33	08/23/16 08:08	1
Chromium	290		5.0	0.61	ug/L		08/18/16 07:33	08/23/16 08:08	1
Cobalt	450		50	0.51	ug/L		08/18/16 07:33	08/23/16 08:08	1
Copper	210		25	3.4	ug/L		08/18/16 07:33	08/23/16 08:08	1
Iron	1400000		500	200	ug/L		08/18/16 07:33	08/23/16 12:06	5
Lead	ND		250	77	ug/L		08/18/16 07:33	08/23/16 17:38	25
Magnesium	150000		5000	79	ug/L		08/18/16 07:33	08/23/16 08:08	1
Manganese	17000		15	1.1	ug/L		08/18/16 07:33	08/23/16 08:08	1
Nickel	1300		40	3.2	ug/L		08/18/16 07:33	08/23/16 08:08	1
Potassium	100000		5000	620	ug/L		08/18/16 07:33	08/23/16 08:08	1
Selenium	20		20	7.5	ug/L		08/18/16 07:33	08/23/16 11:56	2
Sodium	45000		5000	190	ug/L		08/18/16 07:33	08/23/16 08:08	1
Thallium	ND		100	13	ug/L		08/18/16 07:33	08/23/16 12:06	5
Vanadium	690		50	6.9	ug/L		08/18/16 07:33	08/23/16 08:08	1
Zinc	2600		20	6.9	ug/L		08/18/16 07:33	08/23/16 08:08	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/18/16 08:52	08/18/16 14:45	1

Client Sample ID: DUP-01

Date Collected: 08/16/16 00:00

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-6

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	56000		2500	1500	ug/L			08/25/16 14:48	500
Toluene	ND		2500	1800	ug/L			08/25/16 14:48	500
Ethylbenzene	ND		2500	1000	ug/L			08/25/16 14:48	500

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Client Sample ID: DUP-01

Date Collected: 08/16/16 00:00

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-6

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	ND		5000	2300	ug/L			08/25/16 14:48	500
m-Xylene & p-Xylene	ND		2500	970	ug/L			08/25/16 14:48	500
o-Xylene	ND		2500	1500	ug/L			08/25/16 14:48	500
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	94		62 - 123					08/25/16 14:48	500
4-Bromofluorobenzene (Surr)	98		75 - 120					08/25/16 14:48	500
Dibromofluoromethane (Surr)	116		80 - 120					08/25/16 14:48	500
Toluene-d8 (Surr)	95		80 - 120					08/25/16 14:48	500

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L			08/18/16 07:33	08/23/16 08:03
Aluminum	880000		400	74	ug/L			08/18/16 07:33	08/23/16 11:50
Arsenic	160	B	50	24	ug/L			08/18/16 07:33	08/23/16 12:01
Antimony	ND		20	6.4	ug/L			08/18/16 07:33	08/23/16 11:50
Barium	3.7	J	200	3.2	ug/L			08/18/16 07:33	08/23/16 08:03
Beryllium	35		4.0	0.42	ug/L			08/18/16 07:33	08/23/16 08:03
Cadmium	51		25	0.98	ug/L			08/18/16 07:33	08/23/16 12:01
Calcium	280000		5000	89	ug/L			08/18/16 07:33	08/23/16 08:03
Chromium	290		5.0	0.61	ug/L			08/18/16 07:33	08/23/16 08:03
Cobalt	440		50	0.51	ug/L			08/18/16 07:33	08/23/16 08:03
Copper	210		25	3.4	ug/L			08/18/16 07:33	08/23/16 08:03
Iron	1300000		500	200	ug/L			08/18/16 07:33	08/23/16 12:01
Lead	ND		250	77	ug/L			08/18/16 07:33	08/23/16 17:33
Magnesium	150000		5000	79	ug/L			08/18/16 07:33	08/23/16 08:03
Manganese	17000		15	1.1	ug/L			08/18/16 07:33	08/23/16 08:03
Nickel	1300		40	3.2	ug/L			08/18/16 07:33	08/23/16 08:03
Potassium	100000		5000	620	ug/L			08/18/16 07:33	08/23/16 08:03
Selenium	19	J	20	7.5	ug/L			08/18/16 07:33	08/23/16 11:50
Sodium	44000		5000	190	ug/L			08/18/16 07:33	08/23/16 08:03
Thallium	ND		100	13	ug/L			08/18/16 07:33	08/23/16 12:01
Vanadium	670		50	6.9	ug/L			08/18/16 07:33	08/23/16 08:03
Zinc	2500		20	6.9	ug/L			08/18/16 07:33	08/23/16 08:03

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L			08/18/16 08:52	08/18/16 14:47

Client Sample ID: MW-120

Date Collected: 08/16/16 09:05

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-7

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/24/16 11:09	1
Toluene	ND		5.0	3.6	ug/L			08/24/16 11:09	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/24/16 11:09	1
Xylenes, Total	ND		10	4.6	ug/L			08/24/16 11:09	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/24/16 11:09	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Client Sample ID: MW-120

Date Collected: 08/16/16 09:05

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-7

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Xylene	ND		5.0	2.9	ug/L			08/24/16 11:09	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	84		62 - 123					08/24/16 11:09	1
4-Bromofluorobenzene (Surr)	89		75 - 120					08/24/16 11:09	1
Dibromofluoromethane (Surr)	92		80 - 120					08/24/16 11:09	1
Toluene-d8 (Surr)	105		80 - 120					08/24/16 11:09	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L			08/18/16 07:33	08/23/16 07:37
Aluminum	48	J	200	37	ug/L			08/18/16 07:33	08/23/16 07:37
Arsenic	13	B	10	4.8	ug/L			08/18/16 07:33	08/23/16 07:37
Antimony	ND		10	3.2	ug/L			08/18/16 07:33	08/23/16 07:37
Barium	110	J	200	3.2	ug/L			08/18/16 07:33	08/23/16 07:37
Beryllium	ND		4.0	0.42	ug/L			08/18/16 07:33	08/23/16 07:37
Cadmium	0.86	J	5.0	0.20	ug/L			08/18/16 07:33	08/23/16 07:37
Calcium	200000		5000	89	ug/L			08/18/16 07:33	08/23/16 07:37
Chromium	ND		5.0	0.61	ug/L			08/18/16 07:33	08/23/16 07:37
Cobalt	2.3	J	50	0.51	ug/L			08/18/16 07:33	08/23/16 07:37
Copper	ND		25	3.4	ug/L			08/18/16 07:33	08/23/16 07:37
Iron	28000		100	41	ug/L			08/18/16 07:33	08/23/16 07:37
Lead	ND		10	3.1	ug/L			08/18/16 07:33	08/23/16 07:37
Magnesium	30000		5000	79	ug/L			08/18/16 07:33	08/23/16 07:37
Manganese	22000		15	1.1	ug/L			08/18/16 07:33	08/23/16 07:37
Nickel	5.4	J	40	3.2	ug/L			08/18/16 07:33	08/23/16 07:37
Potassium	1400	J	5000	620	ug/L			08/18/16 07:33	08/23/16 07:37
Selenium	ND		10	3.8	ug/L			08/18/16 07:33	08/23/16 07:37
Sodium	60000		5000	190	ug/L			08/18/16 07:33	08/23/16 07:37
Thallium	ND		20	2.6	ug/L			08/18/16 07:33	08/23/16 07:37
Vanadium	ND		50	6.9	ug/L			08/18/16 07:33	08/23/16 07:37
Zinc	ND		20	6.9	ug/L			08/18/16 07:33	08/23/16 07:37

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	F1 F2	0.20	0.052	ug/L			08/18/16 08:52	08/18/16 14:49

Client Sample ID: MW-162

Date Collected: 08/16/16 10:10

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-8

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	29000		2500	1500	ug/L			08/25/16 15:18	500
Toluene	ND		2500	1800	ug/L			08/25/16 15:18	500
Ethylbenzene	ND		2500	1000	ug/L			08/25/16 15:18	500
Xylenes, Total	ND		5000	2300	ug/L			08/25/16 15:18	500
m-Xylene & p-Xylene	ND		2500	970	ug/L			08/25/16 15:18	500
o-Xylene	ND		2500	1500	ug/L			08/25/16 15:18	500

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Client Sample ID: MW-162

Date Collected: 08/16/16 10:10

Date Received: 08/17/16 15:30

Lab Sample ID: 180-57673-8

Matrix: Water

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	91		62 - 123		08/25/16 15:18	500
4-Bromofluorobenzene (Surr)	93		75 - 120		08/25/16 15:18	500
Dibromofluoromethane (Surr)	106		80 - 120		08/25/16 15:18	500
Toluene-d8 (Surr)	91		80 - 120		08/25/16 15:18	500

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/18/16 07:33	08/23/16 07:57	1
Aluminum	80 J		200	37	ug/L		08/18/16 07:33	08/23/16 07:57	1
Arsenic	8.6 J B		10	4.8	ug/L		08/18/16 07:33	08/23/16 07:57	1
Antimony	ND		10	3.2	ug/L		08/18/16 07:33	08/23/16 07:57	1
Barium	78 J		200	3.2	ug/L		08/18/16 07:33	08/23/16 07:57	1
Beryllium	ND		4.0	0.42	ug/L		08/18/16 07:33	08/23/16 07:57	1
Cadmium	2.6 J		5.0	0.20	ug/L		08/18/16 07:33	08/23/16 07:57	1
Calcium	270000		5000	89	ug/L		08/18/16 07:33	08/23/16 07:57	1
Chromium	ND		5.0	0.61	ug/L		08/18/16 07:33	08/23/16 07:57	1
Cobalt	ND		50	0.51	ug/L		08/18/16 07:33	08/23/16 07:57	1
Copper	3.8 J		25	3.4	ug/L		08/18/16 07:33	08/23/16 07:57	1
Iron	84000		100	41	ug/L		08/18/16 07:33	08/23/16 07:57	1
Lead	ND		10	3.1	ug/L		08/18/16 07:33	08/23/16 07:57	1
Magnesium	70000		5000	79	ug/L		08/18/16 07:33	08/23/16 07:57	1
Manganese	13000		15	1.1	ug/L		08/18/16 07:33	08/23/16 07:57	1
Nickel	ND		40	3.2	ug/L		08/18/16 07:33	08/23/16 07:57	1
Potassium	5300		5000	620	ug/L		08/18/16 07:33	08/23/16 07:57	1
Selenium	ND		10	3.8	ug/L		08/18/16 07:33	08/23/16 07:57	1
Sodium	44000		5000	190	ug/L		08/18/16 07:33	08/23/16 07:57	1
Thallium	ND		20	2.6	ug/L		08/18/16 07:33	08/23/16 07:57	1
Vanadium	ND		50	6.9	ug/L		08/18/16 07:33	08/23/16 07:57	1
Zinc	ND		20	6.9	ug/L		08/18/16 07:33	08/23/16 07:57	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/18/16 08:52	08/18/16 14:59	1

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 180-185934/9

Matrix: Water

Analysis Batch: 185934

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	ND		5.0	3.0	ug/L			08/24/16 10:44	1
Toluene	ND		5.0	3.6	ug/L			08/24/16 10:44	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/24/16 10:44	1
Xylenes, Total	ND		10	4.6	ug/L			08/24/16 10:44	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/24/16 10:44	1
o-Xylene	ND		5.0	2.9	ug/L			08/24/16 10:44	1

Surrogate	MB	MB	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
1,2-Dichloroethane-d4 (Surr)	88		62 - 123				08/24/16 10:44	1
4-Bromofluorobenzene (Surr)	89		75 - 120				08/24/16 10:44	1
Dibromofluoromethane (Surr)	92		80 - 120				08/24/16 10:44	1
Toluene-d8 (Surr)	102		80 - 120				08/24/16 10:44	1

Lab Sample ID: LCS 180-185934/6

Matrix: Water

Analysis Batch: 185934

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike	LCS	LCS	Result	Qualifier	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier						
Benzene	40.0	41.0		ug/L			102	80 - 120	
Toluene	40.0	39.3		ug/L			98	80 - 124	
Ethylbenzene	40.0	39.6		ug/L			99	79 - 124	
Xylenes, Total	80.0	79.3		ug/L			99	81 - 121	
m-Xylene & p-Xylene	40.0	39.9		ug/L			100	78 - 124	
o-Xylene	40.0	39.4		ug/L			99	78 - 124	

Surrogate	LCS	LCS	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
1,2-Dichloroethane-d4 (Surr)	111		62 - 123					
4-Bromofluorobenzene (Surr)	103		75 - 120					
Dibromofluoromethane (Surr)	102		80 - 120					
Toluene-d8 (Surr)	101		80 - 120					

Lab Sample ID: 180-57673-7 MS

Matrix: Water

Analysis Batch: 185934

Client Sample ID: MW-120
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Result	Qualifier	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier						
Benzene	ND		40.0	43.1		ug/L			108	80 - 120	
Toluene	ND		40.0	43.1		ug/L			108	80 - 124	
Ethylbenzene	ND		40.0	43.3		ug/L			108	79 - 124	
Xylenes, Total	ND		80.0	87.9		ug/L			110	81 - 121	
m-Xylene & p-Xylene	ND		40.0	44.9		ug/L			112	78 - 124	
o-Xylene	ND		40.0	43.0		ug/L			108	78 - 124	

Surrogate	MS	MS	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
1,2-Dichloroethane-d4 (Surr)	98		62 - 123					
4-Bromofluorobenzene (Surr)	102		75 - 120					
Dibromofluoromethane (Surr)	96		80 - 120					

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 180-57673-7 MS

Matrix: Water

Analysis Batch: 185934

Client Sample ID: MW-120

Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	MS Limits
Toluene-d8 (Surr)	103		80 - 120

Lab Sample ID: 180-57673-7 MSD

Matrix: Water

Analysis Batch: 185934

Client Sample ID: MW-120

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec. Limits	RPD	RPD Limit	
Benzene	ND		40.0	41.8		ug/L		104	80 - 120	3	20
Toluene	ND		40.0	39.7		ug/L		99	80 - 124	8	20
Ethylbenzene	ND		40.0	40.7		ug/L		102	79 - 124	6	25
Xylenes, Total	ND		80.0	80.6		ug/L		101	81 - 121	9	20
m-Xylene & p-Xylene	ND		40.0	40.1		ug/L		100	78 - 124	11	24
o-Xylene	ND		40.0	40.5		ug/L		101	78 - 124	6	22
Surrogate	MSD %Recovery	MSD Qualifier	MSD Limits								
1,2-Dichloroethane-d4 (Surr)	106			62 - 123							
4-Bromofluorobenzene (Surr)	102			75 - 120							
Dibromofluoromethane (Surr)	100			80 - 120							
Toluene-d8 (Surr)	99			80 - 120							

Lab Sample ID: MB 180-186016/8

Matrix: Water

Analysis Batch: 186016

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/25/16 10:43	1
Toluene	ND		5.0	3.6	ug/L			08/25/16 10:43	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/25/16 10:43	1
Xylenes, Total	ND		10	4.6	ug/L			08/25/16 10:43	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/25/16 10:43	1
o-Xylene	ND		5.0	2.9	ug/L			08/25/16 10:43	1
Surrogate	MB %Recovery	MB Qualifier	MB Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	111		62 - 123					08/25/16 10:43	1
4-Bromofluorobenzene (Surr)	103		75 - 120					08/25/16 10:43	1
Dibromofluoromethane (Surr)	111		80 - 120					08/25/16 10:43	1
Toluene-d8 (Surr)	99		80 - 120					08/25/16 10:43	1

Lab Sample ID: LCS 180-186016/5

Matrix: Water

Analysis Batch: 186016

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec. Limits
Benzene	40.0	35.9		ug/L		90
Toluene	40.0	34.1		ug/L		85
Ethylbenzene	40.0	37.4		ug/L		93
Xylenes, Total	80.0	78.5		ug/L		98

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 180-186016/5

Matrix: Water

Analysis Batch: 186016

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte		Spike	LCS	LCS	Unit	D	%Rec	%Rec.	Limits	
		Added	Result	Qualifier						
m-Xylene & p-Xylene		40.0	39.1		ug/L		98	78 - 124		
o-Xylene		40.0	39.4		ug/L		99	78 - 124		
Surrogate										
1,2-Dichloroethane-d4 (Surr)	%Recovery		LCS	LCS						
102				Qualifier						
62 - 123				Limits						
4-Bromofluorobenzene (Surr)	98									
Dibromofluoromethane (Surr)	100									
Toluene-d8 (Surr)	96									

Lab Sample ID: LCSD 180-186016/6

Matrix: Water

Analysis Batch: 186016

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte		Spike	LCSD	LCSD	Unit	D	%Rec	%Rec.	RPD	RPD Limit
		Added	Result	Qualifier						
Benzene		40.0	36.9		ug/L		92	80 - 120	3	20
Toluene		40.0	34.4		ug/L		86	80 - 124	1	20
Ethylbenzene		40.0	38.3		ug/L		96	79 - 124	2	25
Xylenes, Total		80.0	81.7		ug/L		102	81 - 121	4	20
m-Xylene & p-Xylene		40.0	40.5		ug/L		101	78 - 124	4	24
o-Xylene		40.0	41.2		ug/L		103	78 - 124	4	22
Surrogate										
1,2-Dichloroethane-d4 (Surr)	%Recovery		LCSD	LCSD						
101				Qualifier						
62 - 123				Limits						
4-Bromofluorobenzene (Surr)	98									
Dibromofluoromethane (Surr)	101									
Toluene-d8 (Surr)	97									

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 180-185268/1-A

Matrix: Water

Analysis Batch: 185755

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 185268

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Silver	ND		5.0	1.2	ug/L		08/18/16 07:33	08/23/16 07:26	1
Aluminum	ND		200	37	ug/L		08/18/16 07:33	08/23/16 07:26	1
Arsenic	5.12	J	10	4.8	ug/L		08/18/16 07:33	08/23/16 07:26	1
Antimony	ND		10	3.2	ug/L		08/18/16 07:33	08/23/16 07:26	1
Barium	ND		200	3.2	ug/L		08/18/16 07:33	08/23/16 07:26	1
Beryllium	ND		4.0	0.42	ug/L		08/18/16 07:33	08/23/16 07:26	1
Cadmium	ND		5.0	0.20	ug/L		08/18/16 07:33	08/23/16 07:26	1
Calcium	ND		5000	89	ug/L		08/18/16 07:33	08/23/16 07:26	1
Chromium	ND		5.0	0.61	ug/L		08/18/16 07:33	08/23/16 07:26	1
Cobalt	ND		50	0.51	ug/L		08/18/16 07:33	08/23/16 07:26	1
Copper	ND		25	3.4	ug/L		08/18/16 07:33	08/23/16 07:26	1
Iron	ND		100	41	ug/L		08/18/16 07:33	08/23/16 07:26	1
Lead	ND		10	3.1	ug/L		08/18/16 07:33	08/23/16 07:26	1

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: MB 180-185268/1-A

Matrix: Water

Analysis Batch: 185755

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 185268

Analyte	MB		RL	MDL	Unit	D	Prepared		Dil Fac
	Result	Qualifier					Prepared	Analyzed	
Magnesium	ND		5000	79	ug/L	08/18/16 07:33	08/23/16 07:26	1	
Manganese	ND		15	1.1	ug/L	08/18/16 07:33	08/23/16 07:26	1	
Nickel	ND		40	3.2	ug/L	08/18/16 07:33	08/23/16 07:26	1	
Potassium	ND		5000	620	ug/L	08/18/16 07:33	08/23/16 07:26	1	
Selenium	ND		10	3.8	ug/L	08/18/16 07:33	08/23/16 07:26	1	
Sodium	ND		5000	190	ug/L	08/18/16 07:33	08/23/16 07:26	1	
Thallium	ND		20	2.6	ug/L	08/18/16 07:33	08/23/16 07:26	1	
Vanadium	ND		50	6.9	ug/L	08/18/16 07:33	08/23/16 07:26	1	
Zinc	ND		20	6.9	ug/L	08/18/16 07:33	08/23/16 07:26	1	

Lab Sample ID: LCS 180-185268/2-A

Matrix: Water

Analysis Batch: 185755

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 185268

Analyte	Spike Added	LCS		Unit	D	%Rec	Limits
		Result	Qualifier				
Silver	50.0	48.9		ug/L	98	80 - 120	
Aluminum	2000	1930		ug/L	97	80 - 120	
Arsenic	500	487		ug/L	97	80 - 120	
Antimony	500	498		ug/L	100	80 - 120	
Barium	2000	1920		ug/L	96	80 - 120	
Beryllium	50.0	50.0		ug/L	100	80 - 120	
Cadmium	50.0	47.3		ug/L	95	80 - 120	
Calcium	50000	48300		ug/L	97	80 - 120	
Chromium	200	190		ug/L	95	80 - 120	
Cobalt	500	491		ug/L	98	80 - 120	
Copper	250	241		ug/L	96	80 - 120	
Iron	1000	988		ug/L	99	80 - 120	
Lead	500	479		ug/L	96	80 - 120	
Magnesium	50000	47900		ug/L	96	80 - 120	
Manganese	500	473		ug/L	95	80 - 120	
Nickel	500	497		ug/L	99	80 - 120	
Potassium	50000	48700		ug/L	97	80 - 120	
Selenium	500	500		ug/L	100	80 - 120	
Sodium	50000	49000		ug/L	98	80 - 120	
Thallium	500	471		ug/L	94	80 - 120	
Vanadium	500	482		ug/L	96	80 - 120	
Zinc	500	476		ug/L	95	80 - 120	

Lab Sample ID: 180-57673-7 MS

Matrix: Water

Analysis Batch: 185755

Client Sample ID: MW-120

Prep Type: Dissolved

Prep Batch: 185268

Analyte	Sample		Spike Added	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Silver	ND		50.0	49.2		ug/L	98	75 - 125	
Aluminum	48	J	2000	1990		ug/L	97	75 - 125	
Arsenic	13	B	500	523		ug/L	102	75 - 125	
Antimony	ND		500	513		ug/L	103	75 - 125	
Barium	110	J	2000	2030		ug/L	96	75 - 125	
Beryllium	ND		50.0	49.9		ug/L	100	75 - 125	

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 180-57673-7 MS

Matrix: Water

Analysis Batch: 185755

Client Sample ID: MW-120

Prep Type: Dissolved

Prep Batch: 185268

%Rec.

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	
	Result	Qualifier	Added	Result	Qualifier					
Cadmium	0.86	J	50.0	46.9		ug/L	92	75 - 125		
Calcium	200000		50000	238000		ug/L	77	75 - 125		
Chromium	ND		200	184		ug/L	92	75 - 125		
Cobalt	2.3	J	500	507		ug/L	101	75 - 125		
Copper	ND		250	245		ug/L	98	75 - 125		
Iron	28000		1000	28800	4	ug/L	101	75 - 125		
Lead	ND		500	489		ug/L	98	75 - 125		
Magnesium	30000		50000	75900		ug/L	93	75 - 125		
Manganese	22000		500	21900	4	ug/L	-97	75 - 125		
Nickel	5.4	J	500	515		ug/L	102	75 - 125		
Potassium	1400	J	50000	51700		ug/L	101	75 - 125		
Selenium	ND		500	526		ug/L	105	75 - 125		
Sodium	60000		50000	108000		ug/L	96	75 - 125		
Thallium	ND		500	472		ug/L	94	75 - 125		
Vanadium	ND		500	475		ug/L	95	75 - 125		
Zinc	ND		500	468		ug/L	94	75 - 125		

Lab Sample ID: 180-57673-7 MSD

Matrix: Water

Analysis Batch: 185755

Client Sample ID: MW-120

Prep Type: Dissolved

Prep Batch: 185268

%Rec.

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Silver	ND		50.0	51.3		ug/L	103	75 - 125		4	20
Aluminum	48	J	2000	2050		ug/L	100	75 - 125		3	20
Arsenic	13	B	500	543		ug/L	106	75 - 125		4	20
Antimony	ND		500	526		ug/L	105	75 - 125		2	20
Barium	110	J	2000	2090		ug/L	99	75 - 125		3	20
Beryllium	ND		50.0	51.8		ug/L	104	75 - 125		4	20
Cadmium	0.86	J	50.0	48.3		ug/L	95	75 - 125		3	20
Calcium	200000		50000	247000		ug/L	94	75 - 125		3	20
Chromium	ND		200	191		ug/L	96	75 - 125		4	20
Cobalt	2.3	J	500	520		ug/L	104	75 - 125		3	20
Copper	ND		250	255		ug/L	102	75 - 125		4	20
Iron	28000		1000	28600	4	ug/L	77	75 - 125		1	20
Lead	ND		500	499		ug/L	100	75 - 125		2	20
Magnesium	30000		50000	78600		ug/L	98	75 - 125		3	20
Manganese	22000		500	22600	4	ug/L	40	75 - 125		3	20
Nickel	5.4	J	500	528		ug/L	105	75 - 125		3	20
Potassium	1400	J	50000	52900		ug/L	103	75 - 125		2	20
Selenium	ND		500	533		ug/L	107	75 - 125		1	20
Sodium	60000		50000	110000		ug/L	101	75 - 125		2	20
Thallium	ND		500	483		ug/L	97	75 - 125		2	20
Vanadium	ND		500	496		ug/L	99	75 - 125		4	20
Zinc	ND		500	479		ug/L	96	75 - 125		2	20

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 180-185286/1-A

Matrix: Water

Analysis Batch: 185374

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 185286

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/18/16 08:52	08/18/16 15:05	1

Lab Sample ID: LCS 180-185286/2-A

Matrix: Water

Analysis Batch: 185374

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 185286

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	2.50	2.65		ug/L		106	80 - 120

Lab Sample ID: 180-57673-7 MS

Matrix: Water

Analysis Batch: 185374

Client Sample ID: MW-120

Prep Type: Dissolved

Prep Batch: 185286

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Mercury	ND	F1 F2	1.00	0.485	F1	ug/L		48	75 - 125

Lab Sample ID: 180-57673-7 MSD

Matrix: Water

Analysis Batch: 185374

Client Sample ID: MW-120

Prep Type: Dissolved

Prep Batch: 185286

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	RPD
Mercury	ND	F1 F2	1.00	0.354	F1 F2	ug/L		35	75 - 125

TestAmerica Pittsburgh

QC Association Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

GC/MS VOA

Analysis Batch: 185934

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57673-3	FB-01	Total/NA	Water	8260C	5
180-57673-4	MW-163	Total/NA	Water	8260C	5
180-57673-4 - DL	MW-163	Total/NA	Water	8260C	5
180-57673-7	MW-120	Total/NA	Water	8260C	6
MB 180-185934/9	Method Blank	Total/NA	Water	8260C	7
LCS 180-185934/6	Lab Control Sample	Total/NA	Water	8260C	7
180-57673-7 MS	MW-120	Total/NA	Water	8260C	8
180-57673-7 MSD	MW-120	Total/NA	Water	8260C	8

Analysis Batch: 186016

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57673-1	MW-159	Total/NA	Water	8260C	10
180-57673-2	MW-160	Total/NA	Water	8260C	10
180-57673-5	MW-501S	Total/NA	Water	8260C	11
180-57673-6	DUP-01	Total/NA	Water	8260C	11
180-57673-8	MW-162	Total/NA	Water	8260C	12
MB 180-186016/8	Method Blank	Total/NA	Water	8260C	12
LCS 180-186016/5	Lab Control Sample	Total/NA	Water	8260C	13
LCSD 180-186016/6	Lab Control Sample Dup	Total/NA	Water	8260C	13

Metals

Prep Batch: 185268

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57673-1	MW-159	Dissolved	Water	3005A	
180-57673-2	MW-160	Dissolved	Water	3005A	
180-57673-3	FB-01	Dissolved	Water	3005A	
180-57673-4	MW-163	Dissolved	Water	3005A	
180-57673-5	MW-501S	Dissolved	Water	3005A	
180-57673-6	DUP-01	Dissolved	Water	3005A	
180-57673-7	MW-120	Dissolved	Water	3005A	
180-57673-8	MW-162	Dissolved	Water	3005A	
MB 180-185268/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-185268/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-57673-7 MS	MW-120	Dissolved	Water	3005A	
180-57673-7 MSD	MW-120	Dissolved	Water	3005A	

Prep Batch: 185286

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57673-1	MW-159	Dissolved	Water	7470A	
180-57673-2	MW-160	Dissolved	Water	7470A	
180-57673-3	FB-01	Dissolved	Water	7470A	
180-57673-4	MW-163	Dissolved	Water	7470A	
180-57673-5	MW-501S	Dissolved	Water	7470A	
180-57673-6	DUP-01	Dissolved	Water	7470A	
180-57673-7	MW-120	Dissolved	Water	7470A	
180-57673-8	MW-162	Dissolved	Water	7470A	
MB 180-185286/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-185286/2-A	Lab Control Sample	Total/NA	Water	7470A	
180-57673-7 MS	MW-120	Dissolved	Water	7470A	

TestAmerica Pittsburgh

QC Association Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57673-1

Metals (Continued)

Prep Batch: 185286 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57673-7 MSD	MW-120	Dissolved	Water	7470A	

Analysis Batch: 185374

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57673-1	MW-159	Dissolved	Water	7470A	185286
180-57673-2	MW-160	Dissolved	Water	7470A	185286
180-57673-3	FB-01	Dissolved	Water	7470A	185286
180-57673-4	MW-163	Dissolved	Water	7470A	185286
180-57673-5	MW-501S	Dissolved	Water	7470A	185286
180-57673-6	DUP-01	Dissolved	Water	7470A	185286
180-57673-7	MW-120	Dissolved	Water	7470A	185286
180-57673-8	MW-162	Dissolved	Water	7470A	185286
MB 180-185286/1-A	Method Blank	Total/NA	Water	7470A	185286
LCS 180-185286/2-A	Lab Control Sample	Total/NA	Water	7470A	185286
180-57673-7 MS	MW-120	Dissolved	Water	7470A	185286
180-57673-7 MSD	MW-120	Dissolved	Water	7470A	185286

Analysis Batch: 185755

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57673-1	MW-159	Dissolved	Water	6010C	185268
180-57673-2	MW-160	Dissolved	Water	6010C	185268
180-57673-3	FB-01	Dissolved	Water	6010C	185268
180-57673-4	MW-163	Dissolved	Water	6010C	185268
180-57673-5	MW-501S	Dissolved	Water	6010C	185268
180-57673-6	DUP-01	Dissolved	Water	6010C	185268
180-57673-7	MW-120	Dissolved	Water	6010C	185268
180-57673-8	MW-162	Dissolved	Water	6010C	185268
MB 180-185268/1-A	Method Blank	Total Recoverable	Water	6010C	185268
LCS 180-185268/2-A	Lab Control Sample	Total Recoverable	Water	6010C	185268
180-57673-7 MS	MW-120	Dissolved	Water	6010C	185268
180-57673-7 MSD	MW-120	Dissolved	Water	6010C	185268

Analysis Batch: 185787

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57673-1	MW-159	Dissolved	Water	6010C	185268
180-57673-4	MW-163	Dissolved	Water	6010C	185268
180-57673-4	MW-163	Dissolved	Water	6010C	185268
180-57673-5	MW-501S	Dissolved	Water	6010C	185268
180-57673-5	MW-501S	Dissolved	Water	6010C	185268
180-57673-6	DUP-01	Dissolved	Water	6010C	185268
180-57673-6	DUP-01	Dissolved	Water	6010C	185268

Analysis Batch: 185837

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57673-5	MW-501S	Dissolved	Water	6010C	185268
180-57673-6	DUP-01	Dissolved	Water	6010C	185268

TestAmerica Pittsburgh

TestAmerica Pittsburgh
301 Alpha Drive

301 Alpha Drive

Chain of Custody Record

301 Alpha Drive
Pittsburgh, PA 15238
Phone: 412.963.7058 Fax: 412.963.2470

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THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.

146832

Page 28 of 29

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 180-57673-1

Login Number: 57673

List Source: TestAmerica Pittsburgh

List Number: 1

Creator: Watson, Debbie

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	False	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Pittsburgh

301 Alpha Drive

RIDC Park

Pittsburgh, PA 15238

Tel: (412)963-7058

TestAmerica Job ID: 180-57777-1

Client Project/Site: Lyondell Beaver Valley Plant Groundwater

For:

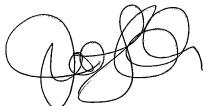
Tetra Tech, Inc.

Foster Plaza 7

661 Anderson Drive

Pittsburgh, Pennsylvania 15220-2745

Attn: Mr. Jonathon Aglio



Authorized for release by:

9/2/2016 2:57:29 PM

Jill Colussy, Project Manager I

(412)963-2444

jill.colussy@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Job ID: 180-57777-1

Laboratory: TestAmerica Pittsburgh

Narrative

Job Narrative 180-57777-1

Receipt

The samples were received on 8/19/2016 5:20 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.2° C, 3.1° C and 4.2° C.

The laboratory received two of three VOA Vials with headspace for sample SW-01 (180-57777-1).

GC/MS VOA

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Definitions/Glossary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.
F1	MS and/or MSD Recovery is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation

These commonly used abbreviations may or may not be present in this report.

¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Certification Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Laboratory: TestAmerica Pittsburgh

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Pennsylvania	NELAP	3	02-00416	04-30-17
Analysis Method	Prep Method	Matrix	Analyte	

1

2

3

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13

Sample Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-57777-1	SW-01	Water	08/18/16 07:40	08/19/16 17:20
180-57777-2	SW-02	Water	08/18/16 07:46	08/19/16 17:20
180-57777-3	SW-03	Water	08/18/16 07:53	08/19/16 17:20
180-57777-4	SW-04	Water	08/18/16 08:06	08/19/16 17:20
180-57777-5	SW-05	Water	08/18/16 08:12	08/19/16 17:20
180-57777-6	SW-06	Water	08/18/16 08:15	08/19/16 17:20
180-57777-7	SW-07	Water	08/18/16 08:30	08/19/16 17:20
180-57777-8	SW-08	Water	08/18/16 08:33	08/19/16 17:20
180-57777-9	SW-09	Water	08/18/16 08:35	08/19/16 17:20
180-57777-10	DUP-02	Water	08/18/16 00:00	08/19/16 17:20
180-57777-11	FB-02	Water	08/18/16 08:00	08/19/16 17:20
180-57777-12	SED-01	Solid	08/18/16 10:30	08/19/16 17:20
180-57777-13	SED-02	Solid	08/18/16 10:45	08/19/16 17:20
180-57777-14	SED-03	Solid	08/18/16 11:00	08/19/16 17:20
180-57777-15	DUP-03	Solid	08/18/16 00:00	08/19/16 17:20

TestAmerica Pittsburgh

Method Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	TAL PIT
6010C	Metals (ICP)	SW846	TAL PIT
7470A	Mercury (CVAA)	SW846	TAL PIT
7471B	Mercury (CVAA)	SW846	TAL PIT
2540G	SM 2540G	SM22	TAL PIT

Protocol References:

SM22 = SM22

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-01

Date Collected: 08/18/16 07:40

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C Instrument ID: CHHP4		1	5 mL	5 mL	185721	08/23/16 14:32	PJJ	TAL PIT
Dissolved	Prep	3005A			50 mL	50 mL	185619	08/22/16 07:53	ANA	TAL PIT
Dissolved	Analysis	6010C Instrument ID: Q		1			186588	08/31/16 06:44	RJR	TAL PIT
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C Instrument ID: Q		1			186107	08/25/16 10:45	RJR	TAL PIT
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C Instrument ID: Q		1			186270	08/26/16 19:03	RJR	TAL PIT
Dissolved	Prep	7470A			50 mL	50 mL	185680	08/22/16 13:49	EVR	TAL PIT
Dissolved	Analysis	7470A Instrument ID: K		1			185803	08/23/16 12:27	EVR	TAL PIT
Total/NA	Prep	7470A			50 mL	50 mL	185679	08/22/16 13:40	EVR	TAL PIT
Total/NA	Analysis	7470A Instrument ID: K		1			185803	08/23/16 12:12	EVR	TAL PIT

Client Sample ID: SW-02

Date Collected: 08/18/16 07:46

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C Instrument ID: CHHP4		1	5 mL	5 mL	185721	08/23/16 14:58	PJJ	TAL PIT
Dissolved	Prep	3005A			50 mL	50 mL	185619	08/22/16 07:53	ANA	TAL PIT
Dissolved	Analysis	6010C Instrument ID: Q		1			186588	08/31/16 06:49	RJR	TAL PIT
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C Instrument ID: Q		1			186107	08/25/16 10:50	RJR	TAL PIT
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C Instrument ID: Q		1			186270	08/26/16 19:09	RJR	TAL PIT
Dissolved	Prep	7470A			50 mL	50 mL	185680	08/22/16 13:49	EVR	TAL PIT
Dissolved	Analysis	7470A Instrument ID: K		1			185803	08/23/16 12:30	EVR	TAL PIT
Total/NA	Prep	7470A			50 mL	50 mL	185679	08/22/16 13:40	EVR	TAL PIT
Total/NA	Analysis	7470A Instrument ID: K		1			185803	08/23/16 11:16	EVR	TAL PIT

Lab Chronicle

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-03

Date Collected: 08/18/16 07:53

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	185721	08/23/16 17:55	PJJ	TAL PIT
		Instrument ID: CHHP4								
Dissolved	Prep	3005A			50 mL	50 mL	185619	08/22/16 07:53	ANA	TAL PIT
Dissolved	Analysis	6010C		1			186588	08/31/16 06:55	RJR	TAL PIT
		Instrument ID: Q								
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C		1			186107	08/25/16 10:55	RJR	TAL PIT
		Instrument ID: Q								
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C		1			186270	08/26/16 19:14	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185680	08/22/16 13:49	EVR	TAL PIT
Dissolved	Analysis	7470A		1			185803	08/23/16 12:36	EVR	TAL PIT
		Instrument ID: K								
Total/NA	Prep	7470A			50 mL	50 mL	185679	08/22/16 13:40	EVR	TAL PIT
Total/NA	Analysis	7470A		1			185803	08/23/16 11:18	EVR	TAL PIT
		Instrument ID: K								

Client Sample ID: SW-04

Date Collected: 08/18/16 08:06

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	185721	08/23/16 18:20	PJJ	TAL PIT
		Instrument ID: CHHP4								
Dissolved	Prep	3005A			50 mL	50 mL	185619	08/22/16 07:53	ANA	TAL PIT
Dissolved	Analysis	6010C		1			186588	08/31/16 07:00	RJR	TAL PIT
		Instrument ID: Q								
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C		1			186107	08/25/16 11:01	RJR	TAL PIT
		Instrument ID: Q								
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C		1			186270	08/26/16 19:19	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185680	08/22/16 13:49	EVR	TAL PIT
Dissolved	Analysis	7470A		1			185803	08/23/16 12:37	EVR	TAL PIT
		Instrument ID: K								
Total/NA	Prep	7470A			50 mL	50 mL	185679	08/22/16 13:40	EVR	TAL PIT
Total/NA	Analysis	7470A		1			185803	08/23/16 11:20	EVR	TAL PIT
		Instrument ID: K								

TestAmerica Pittsburgh

Lab Chronicle

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-05

Date Collected: 08/18/16 08:12

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	185721	08/23/16 18:46	PJJ	TAL PIT
		Instrument ID: CHHP4								
Dissolved	Prep	3005A			50 mL	50 mL	185619	08/22/16 07:53	ANA	TAL PIT
Dissolved	Analysis	6010C		1			186588	08/31/16 07:05	RJR	TAL PIT
		Instrument ID: Q								
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C		1			186107	08/25/16 11:06	RJR	TAL PIT
		Instrument ID: Q								
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C		1			186270	08/26/16 19:25	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185680	08/22/16 13:49	EVR	TAL PIT
Dissolved	Analysis	7470A		1			185803	08/23/16 12:39	EVR	TAL PIT
		Instrument ID: K								
Total/NA	Prep	7470A			50 mL	50 mL	185679	08/22/16 13:40	EVR	TAL PIT
Total/NA	Analysis	7470A		1			185803	08/23/16 11:26	EVR	TAL PIT
		Instrument ID: K								

Client Sample ID: SW-06

Date Collected: 08/18/16 08:15

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	185721	08/23/16 19:11	PJJ	TAL PIT
		Instrument ID: CHHP4								
Dissolved	Prep	3005A			50 mL	50 mL	185619	08/22/16 07:53	ANA	TAL PIT
Dissolved	Analysis	6010C		1			186588	08/31/16 07:11	RJR	TAL PIT
		Instrument ID: Q								
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C		1			186107	08/25/16 11:11	RJR	TAL PIT
		Instrument ID: Q								
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C		1			186270	08/26/16 19:30	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185680	08/22/16 13:49	EVR	TAL PIT
Dissolved	Analysis	7470A		1			185803	08/23/16 12:41	EVR	TAL PIT
		Instrument ID: K								
Total/NA	Prep	7470A			50 mL	50 mL	185679	08/22/16 13:40	EVR	TAL PIT
Total/NA	Analysis	7470A		1			185803	08/23/16 11:27	EVR	TAL PIT
		Instrument ID: K								

TestAmerica Pittsburgh

Lab Chronicle

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-07

Date Collected: 08/18/16 08:30

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	185721	08/23/16 12:51	PJJ	TAL PIT
		Instrument ID: CHHP4								
Dissolved	Prep	3005A			50 mL	50 mL	185619	08/22/16 07:53	ANA	TAL PIT
Dissolved	Analysis	6010C		1			186588	08/31/16 07:16	RJR	TAL PIT
		Instrument ID: Q								
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C		1			186107	08/25/16 09:52	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185680	08/22/16 13:49	EVR	TAL PIT
Dissolved	Analysis	7470A		1			185803	08/23/16 12:43	EVR	TAL PIT
		Instrument ID: K								
Total/NA	Prep	7470A			50 mL	50 mL	185679	08/22/16 13:40	EVR	TAL PIT
Total/NA	Analysis	7470A		1			185803	08/23/16 11:29	EVR	TAL PIT
		Instrument ID: K								

Client Sample ID: SW-08

Date Collected: 08/18/16 08:33

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-8

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	186016	08/25/16 11:08	PJJ	TAL PIT
		Instrument ID: CHHP7								
Dissolved	Prep	3005A			50 mL	50 mL	185619	08/22/16 07:53	ANA	TAL PIT
Dissolved	Analysis	6010C		1			186588	08/31/16 07:47	RJR	TAL PIT
		Instrument ID: Q								
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C		1			186107	08/25/16 10:13	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185680	08/22/16 13:49	EVR	TAL PIT
Dissolved	Analysis	7470A		1			185803	08/23/16 12:49	EVR	TAL PIT
		Instrument ID: K								
Total/NA	Prep	7470A			50 mL	50 mL	185679	08/22/16 13:40	EVR	TAL PIT
Total/NA	Analysis	7470A		1			185803	08/23/16 11:35	EVR	TAL PIT
		Instrument ID: K								

Client Sample ID: SW-09

Date Collected: 08/18/16 08:35

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-9

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	185721	08/23/16 19:36	PJJ	TAL PIT
		Instrument ID: CHHP4								
Dissolved	Prep	3005A			50 mL	50 mL	185619	08/22/16 07:53	ANA	TAL PIT

TestAmerica Pittsburgh

Lab Chronicle

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-09

Date Collected: 08/18/16 08:35

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-9

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010C		1			186588	08/31/16 07:52	RJR	TAL PIT
		Instrument ID: Q								
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C		1			186107	08/25/16 10:18	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185680	08/22/16 13:49	EVR	TAL PIT
Dissolved	Analysis	7470A		1			185803	08/23/16 12:51	EVR	TAL PIT
		Instrument ID: K								
Total/NA	Prep	7470A			50 mL	50 mL	185679	08/22/16 13:40	EVR	TAL PIT
Total/NA	Analysis	7470A		1			185803	08/23/16 11:37	EVR	TAL PIT
		Instrument ID: K								

Client Sample ID: DUP-02

Date Collected: 08/18/16 00:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-10

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	186016	08/25/16 11:33	PJJ	TAL PIT
		Instrument ID: CHHP7								
Dissolved	Prep	3005A			50 mL	50 mL	185619	08/22/16 07:53	ANA	TAL PIT
Dissolved	Analysis	6010C		1			186588	08/31/16 07:58	RJR	TAL PIT
		Instrument ID: Q								
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT
Total Recoverable	Analysis	6010C		1			186107	08/25/16 10:23	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185680	08/22/16 13:49	EVR	TAL PIT
Dissolved	Analysis	7470A		1			185803	08/23/16 12:53	EVR	TAL PIT
		Instrument ID: K								
Total/NA	Prep	7470A			50 mL	50 mL	185679	08/22/16 13:48	EVR	TAL PIT
Total/NA	Analysis	7470A		1			185803	08/23/16 11:39	EVR	TAL PIT
		Instrument ID: K								

Client Sample ID: FB-02

Date Collected: 08/18/16 08:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-11

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	185721	08/23/16 12:26	PJJ	TAL PIT
		Instrument ID: CHHP4								
Dissolved	Prep	3005A			50 mL	50 mL	185619	08/22/16 07:53	ANA	TAL PIT
Dissolved	Analysis	6010C		1			186588	08/31/16 08:03	RJR	TAL PIT
		Instrument ID: Q								
Total Recoverable	Prep	3005A			50 mL	50 mL	185618	08/22/16 07:51	ANA	TAL PIT

TestAmerica Pittsburgh

Lab Chronicle

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: FB-02

Date Collected: 08/18/16 08:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-11

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Analysis	6010C		1			186107	08/25/16 10:29	RJR	TAL PIT
		Instrument ID: Q								
Dissolved	Prep	7470A			50 mL	50 mL	185680	08/22/16 13:49	EVR	TAL PIT
Dissolved	Analysis	7470A		1			185803	08/23/16 12:59	EVR	TAL PIT
		Instrument ID: K								
Total/NA	Prep	7470A			50 mL	50 mL	185679	08/22/16 13:48	EVR	TAL PIT
Total/NA	Analysis	7470A		1			185803	08/23/16 11:41	EVR	TAL PIT
		Instrument ID: K								

Client Sample ID: SED-01

Date Collected: 08/18/16 10:30

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-12

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			185580	08/21/16 14:11	JLR	TAL PIT
		Instrument ID: NOEQUIP								

Client Sample ID: SED-01

Date Collected: 08/18/16 10:30

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-12

Matrix: Solid

Percent Solids: 68.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.6016 g	5 mL	185604	08/22/16 05:29	KLG	TAL PIT
Total/NA	Analysis	8260C		1	5 mL	5 mL	185600	08/22/16 15:43	KLG	TAL PIT
		Instrument ID: CHHP3								
Total/NA	Prep	3050B			1.12 g	100 mL	185630	08/22/16 09:13	ANA	TAL PIT
Total/NA	Analysis	6010C		1			185879	08/24/16 07:26	RJR	TAL PIT
		Instrument ID: Q								
Total/NA	Prep	7471B			0.61 g	100 mL	185484	08/22/16 07:52	EVR	TAL PIT
Total/NA	Analysis	7471B		1			185691	08/22/16 11:32	EVR	TAL PIT
		Instrument ID: K								

Client Sample ID: SED-02

Date Collected: 08/18/16 10:45

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-13

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			185580	08/21/16 14:11	JLR	TAL PIT
		Instrument ID: NOEQUIP								

TestAmerica Pittsburgh

Lab Chronicle

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SED-02

Date Collected: 08/18/16 10:45

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-13

Matrix: Solid

Percent Solids: 65.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.0116 g	5 mL	185604	08/22/16 05:29	KLG	TAL PIT
Total/NA	Analysis	8260C Instrument ID: CHHP3		1	5 mL	5 mL	185600	08/22/16 16:06	KLG	TAL PIT
Total/NA	Prep	3050B			1.06 g	100 mL	185630	08/22/16 09:13	ANA	TAL PIT
Total/NA	Analysis	6010C Instrument ID: Q		1			185879	08/24/16 07:31	RJR	TAL PIT
Total/NA	Prep	7471B			0.71 g	100 mL	185484	08/22/16 07:52	EVR	TAL PIT
Total/NA	Analysis	7471B Instrument ID: K		1			185691	08/22/16 11:34	EVR	TAL PIT

Client Sample ID: SED-03

Date Collected: 08/18/16 11:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-14

Matrix: Solid

Percent Solids: 65.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G Instrument ID: NOEQUIP		1			185580	08/21/16 14:11	JLR	TAL PIT

Client Sample ID: SED-03

Date Collected: 08/18/16 11:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-14

Matrix: Solid

Percent Solids: 74.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			6.1448 g	5 mL	185604	08/22/16 05:29	KLG	TAL PIT
Total/NA	Analysis	8260C Instrument ID: CHHP3		1	5 mL	5 mL	185600	08/22/16 08:58	KLG	TAL PIT
Total/NA	Prep	3050B			1.00 g	100 mL	185630	08/22/16 09:13	ANA	TAL PIT
Total/NA	Analysis	6010C Instrument ID: Q		1			185879	08/24/16 07:01	RJR	TAL PIT
Total/NA	Prep	7471B			0.68 g	100 mL	185484	08/22/16 07:52	EVR	TAL PIT
Total/NA	Analysis	7471B Instrument ID: K		1			185691	08/22/16 11:40	EVR	TAL PIT

Client Sample ID: DUP-03

Date Collected: 08/18/16 00:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-15

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G Instrument ID: NOEQUIP		1			185581	08/21/16 15:18	JLR	TAL PIT

TestAmerica Pittsburgh

Lab Chronicle

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: DUP-03

Date Collected: 08/18/16 00:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-15

Matrix: Solid

Percent Solids: 63.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.4244 g	5 mL	185712	08/23/16 06:17	KLG	TAL PIT
Total/NA	Analysis	8260C Instrument ID: CHHP3		1	5 mL	5 mL	185706	08/23/16 10:24	KLG	TAL PIT
Total/NA	Prep	3050B			1.08 g	100 mL	185630	08/22/16 09:13	ANA	TAL PIT
Total/NA	Analysis	6010C Instrument ID: Q		1			185879	08/24/16 07:36	RJR	TAL PIT
Total/NA	Prep	7471B			0.72 g	100 mL	185484	08/22/16 07:52	EVR	TAL PIT
Total/NA	Analysis	7471B Instrument ID: K		1			185691	08/22/16 11:46	EVR	TAL PIT

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Analyst References:

Lab: TAL PIT

Batch Type: Prep

ANA = Alexis Anderson

EVR = Emilie Reichenbach

KLG = Kathy Gordon

Batch Type: Analysis

EVR = Emilie Reichenbach

JLR = Jennifer Rumble

KLG = Kathy Gordon

PJJ = Patrick Journet

RJR = Ron Rosenbaum

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-01

Date Collected: 08/18/16 07:40

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-1

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/23/16 14:32	1
Toluene	ND		5.0	3.6	ug/L			08/23/16 14:32	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/23/16 14:32	1
Xylenes, Total	ND		10	4.6	ug/L			08/23/16 14:32	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/23/16 14:32	1
o-Xylene	ND		5.0	2.9	ug/L			08/23/16 14:32	1
Surrogate		%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	87			62 - 123				08/23/16 14:32	1
4-Bromofluorobenzene (Surr)	92			75 - 120				08/23/16 14:32	1
Dibromofluoromethane (Surr)	94			80 - 120				08/23/16 14:32	1
Toluene-d8 (Surr)	100			80 - 120				08/23/16 14:32	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L			08/22/16 07:51	08/25/16 10:45
Aluminum	820		200	37	ug/L			08/22/16 07:51	08/25/16 10:45
Arsenic	ND		10	4.8	ug/L			08/22/16 07:51	08/25/16 10:45
Antimony	ND		10	3.2	ug/L			08/22/16 07:51	08/25/16 10:45
Barium	49 J		200	3.2	ug/L			08/22/16 07:51	08/25/16 10:45
Beryllium	ND		4.0	0.42	ug/L			08/22/16 07:51	08/25/16 10:45
Cadmium	ND		5.0	0.20	ug/L			08/22/16 07:51	08/26/16 19:03
Calcium	84000 B		5000	89	ug/L			08/22/16 07:51	08/25/16 10:45
Chromium	1.1 J		5.0	0.61	ug/L			08/22/16 07:51	08/25/16 10:45
Cobalt	0.97 J		50	0.51	ug/L			08/22/16 07:51	08/25/16 10:45
Copper	6.9 JB		25	3.4	ug/L			08/22/16 07:51	08/25/16 10:45
Iron	1500		100	41	ug/L			08/22/16 07:51	08/25/16 10:45
Lead	4.0 J		10	3.1	ug/L			08/22/16 07:51	08/25/16 10:45
Magnesium	28000		5000	79	ug/L			08/22/16 07:51	08/25/16 10:45
Manganese	120		15	1.1	ug/L			08/22/16 07:51	08/25/16 10:45
Nickel	4.1 J		40	3.2	ug/L			08/22/16 07:51	08/25/16 10:45
Potassium	4300 J		5000	620	ug/L			08/22/16 07:51	08/25/16 10:45
Selenium	ND		10	3.8	ug/L			08/22/16 07:51	08/25/16 10:45
Sodium	37000 B		5000	190	ug/L			08/22/16 07:51	08/25/16 10:45
Thallium	ND		20	2.6	ug/L			08/22/16 07:51	08/25/16 10:45
Vanadium	ND		50	6.9	ug/L			08/22/16 07:51	08/25/16 10:45
Zinc	23		20	6.9	ug/L			08/22/16 07:51	08/25/16 10:45

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L			08/22/16 07:53	08/31/16 06:44
Aluminum	ND		200	37	ug/L			08/22/16 07:53	08/31/16 06:44
Arsenic	ND		10	4.8	ug/L			08/22/16 07:53	08/31/16 06:44
Antimony	ND		10	3.2	ug/L			08/22/16 07:53	08/31/16 06:44
Barium	43 J		200	3.2	ug/L			08/22/16 07:53	08/31/16 06:44
Beryllium	ND		4.0	0.42	ug/L			08/22/16 07:53	08/31/16 06:44
Cadmium	ND		5.0	0.20	ug/L			08/22/16 07:53	08/31/16 06:44
Calcium	82000		5000	89	ug/L			08/22/16 07:53	08/31/16 06:44
Chromium	ND		5.0	0.61	ug/L			08/22/16 07:53	08/31/16 06:44
Cobalt	ND		50	0.51	ug/L			08/22/16 07:53	08/31/16 06:44

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-01

Date Collected: 08/18/16 07:40

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-1

Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Copper	ND		25	3.4	ug/L		08/22/16 07:53	08/31/16 06:44	1
Iron	ND		100	41	ug/L		08/22/16 07:53	08/31/16 06:44	1
Lead	ND		10	3.1	ug/L		08/22/16 07:53	08/31/16 06:44	1
Magnesium	28000		5000	79	ug/L		08/22/16 07:53	08/31/16 06:44	1
Manganese	32		15	1.1	ug/L		08/22/16 07:53	08/31/16 06:44	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:53	08/31/16 06:44	1
Potassium	4200 J		5000	620	ug/L		08/22/16 07:53	08/31/16 06:44	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:53	08/31/16 06:44	1
Sodium	37000		5000	190	ug/L		08/22/16 07:53	08/31/16 06:44	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:53	08/31/16 06:44	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:53	08/31/16 06:44	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:53	08/31/16 06:44	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:40	08/23/16 12:12	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:49	08/23/16 12:27	1

Client Sample ID: SW-02

Date Collected: 08/18/16 07:46

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-2

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/23/16 14:58	1
Toluene	ND		5.0	3.6	ug/L			08/23/16 14:58	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/23/16 14:58	1
Xylenes, Total	ND		10	4.6	ug/L			08/23/16 14:58	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/23/16 14:58	1
o-Xylene	ND		5.0	2.9	ug/L			08/23/16 14:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	90		62 - 123					08/23/16 14:58	1
4-Bromofluorobenzene (Surr)	93		75 - 120					08/23/16 14:58	1
Dibromofluoromethane (Surr)	92		80 - 120					08/23/16 14:58	1
Toluene-d8 (Surr)	103		80 - 120					08/23/16 14:58	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:51	08/25/16 10:50	1
Aluminum	370		200	37	ug/L		08/22/16 07:51	08/25/16 10:50	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:51	08/25/16 10:50	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:51	08/25/16 10:50	1
Barium	48 J		200	3.2	ug/L		08/22/16 07:51	08/25/16 10:50	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:51	08/25/16 10:50	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:51	08/26/16 19:09	1
Calcium	83000 B		5000	89	ug/L		08/22/16 07:51	08/25/16 10:50	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:51	08/25/16 10:50	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-02

Date Collected: 08/18/16 07:46

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-2

Matrix: Water

Method: 6010C - Metals (ICP) - Total Recoverable (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	1.2	J	50	0.51	ug/L		08/22/16 07:51	08/25/16 10:50	1
Copper	6.2	J B	25	3.4	ug/L		08/22/16 07:51	08/25/16 10:50	1
Iron	670		100	41	ug/L		08/22/16 07:51	08/25/16 10:50	1
Lead	4.5	J	10	3.1	ug/L		08/22/16 07:51	08/25/16 10:50	1
Magnesium	27000		5000	79	ug/L		08/22/16 07:51	08/25/16 10:50	1
Manganese	140		15	1.1	ug/L		08/22/16 07:51	08/25/16 10:50	1
Nickel	3.3	J	40	3.2	ug/L		08/22/16 07:51	08/25/16 10:50	1
Potassium	4200	J	5000	620	ug/L		08/22/16 07:51	08/25/16 10:50	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:51	08/25/16 10:50	1
Sodium	37000	B	5000	190	ug/L		08/22/16 07:51	08/25/16 10:50	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:51	08/25/16 10:50	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:51	08/25/16 10:50	1
Zinc	22		20	6.9	ug/L		08/22/16 07:51	08/25/16 10:50	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:53	08/31/16 06:49	1
Aluminum	ND		200	37	ug/L		08/22/16 07:53	08/31/16 06:49	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:53	08/31/16 06:49	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:53	08/31/16 06:49	1
Barium	46	J	200	3.2	ug/L		08/22/16 07:53	08/31/16 06:49	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:53	08/31/16 06:49	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:53	08/31/16 06:49	1
Calcium	87000		5000	89	ug/L		08/22/16 07:53	08/31/16 06:49	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:53	08/31/16 06:49	1
Cobalt	ND		50	0.51	ug/L		08/22/16 07:53	08/31/16 06:49	1
Copper	ND		25	3.4	ug/L		08/22/16 07:53	08/31/16 06:49	1
Iron	ND		100	41	ug/L		08/22/16 07:53	08/31/16 06:49	1
Lead	ND		10	3.1	ug/L		08/22/16 07:53	08/31/16 06:49	1
Magnesium	29000		5000	79	ug/L		08/22/16 07:53	08/31/16 06:49	1
Manganese	33		15	1.1	ug/L		08/22/16 07:53	08/31/16 06:49	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:53	08/31/16 06:49	1
Potassium	4400	J	5000	620	ug/L		08/22/16 07:53	08/31/16 06:49	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:53	08/31/16 06:49	1
Sodium	39000		5000	190	ug/L		08/22/16 07:53	08/31/16 06:49	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:53	08/31/16 06:49	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:53	08/31/16 06:49	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:53	08/31/16 06:49	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:40	08/23/16 11:16	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:49	08/23/16 12:30	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-03

Date Collected: 08/18/16 07:53

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-3

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/23/16 17:55	1
Toluene	ND		5.0	3.6	ug/L			08/23/16 17:55	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/23/16 17:55	1
Xylenes, Total	ND		10	4.6	ug/L			08/23/16 17:55	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/23/16 17:55	1
o-Xylene	ND		5.0	2.9	ug/L			08/23/16 17:55	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	101		62 - 123					08/23/16 17:55	1
4-Bromofluorobenzene (Surr)	107		75 - 120					08/23/16 17:55	1
Dibromofluoromethane (Surr)	103		80 - 120					08/23/16 17:55	1
Toluene-d8 (Surr)	109		80 - 120					08/23/16 17:55	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:51	08/25/16 10:55	1
Aluminum	370		200	37	ug/L		08/22/16 07:51	08/25/16 10:55	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:51	08/25/16 10:55	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:51	08/25/16 10:55	1
Barium	48 J		200	3.2	ug/L		08/22/16 07:51	08/25/16 10:55	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:51	08/25/16 10:55	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:51	08/26/16 19:14	1
Calcium	85000 B		5000	89	ug/L		08/22/16 07:51	08/25/16 10:55	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:51	08/25/16 10:55	1
Cobalt	0.80 J		50	0.51	ug/L		08/22/16 07:51	08/25/16 10:55	1
Copper	4.2 JB		25	3.4	ug/L		08/22/16 07:51	08/25/16 10:55	1
Iron	690		100	41	ug/L		08/22/16 07:51	08/25/16 10:55	1
Lead	3.4 J		10	3.1	ug/L		08/22/16 07:51	08/25/16 10:55	1
Magnesium	28000		5000	79	ug/L		08/22/16 07:51	08/25/16 10:55	1
Manganese	110		15	1.1	ug/L		08/22/16 07:51	08/25/16 10:55	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:51	08/25/16 10:55	1
Potassium	4200 J		5000	620	ug/L		08/22/16 07:51	08/25/16 10:55	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:51	08/25/16 10:55	1
Sodium	38000 B		5000	190	ug/L		08/22/16 07:51	08/25/16 10:55	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:51	08/25/16 10:55	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:51	08/25/16 10:55	1
Zinc	18 J		20	6.9	ug/L		08/22/16 07:51	08/25/16 10:55	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:53	08/31/16 06:55	1
Aluminum	ND		200	37	ug/L		08/22/16 07:53	08/31/16 06:55	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:53	08/31/16 06:55	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:53	08/31/16 06:55	1
Barium	48 J		200	3.2	ug/L		08/22/16 07:53	08/31/16 06:55	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:53	08/31/16 06:55	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:53	08/31/16 06:55	1
Calcium	91000		5000	89	ug/L		08/22/16 07:53	08/31/16 06:55	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:53	08/31/16 06:55	1
Cobalt	ND		50	0.51	ug/L		08/22/16 07:53	08/31/16 06:55	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-03

Date Collected: 08/18/16 07:53

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-3

Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Copper	ND		25	3.4	ug/L		08/22/16 07:53	08/31/16 06:55	1
Iron	ND		100	41	ug/L		08/22/16 07:53	08/31/16 06:55	1
Lead	ND		10	3.1	ug/L		08/22/16 07:53	08/31/16 06:55	1
Magnesium	30000		5000	79	ug/L		08/22/16 07:53	08/31/16 06:55	1
Manganese	37		15	1.1	ug/L		08/22/16 07:53	08/31/16 06:55	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:53	08/31/16 06:55	1
Potassium	4400 J		5000	620	ug/L		08/22/16 07:53	08/31/16 06:55	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:53	08/31/16 06:55	1
Sodium	41000		5000	190	ug/L		08/22/16 07:53	08/31/16 06:55	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:53	08/31/16 06:55	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:53	08/31/16 06:55	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:53	08/31/16 06:55	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:40	08/23/16 11:18	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:49	08/23/16 12:36	1

Client Sample ID: SW-04

Date Collected: 08/18/16 08:06

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-4

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/23/16 18:20	1
Toluene	ND		5.0	3.6	ug/L			08/23/16 18:20	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/23/16 18:20	1
Xylenes, Total	ND		10	4.6	ug/L			08/23/16 18:20	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/23/16 18:20	1
o-Xylene	ND		5.0	2.9	ug/L			08/23/16 18:20	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	101		62 - 123					08/23/16 18:20	1
4-Bromofluorobenzene (Surr)	103		75 - 120					08/23/16 18:20	1
Dibromofluoromethane (Surr)	101		80 - 120					08/23/16 18:20	1
Toluene-d8 (Surr)	108		80 - 120					08/23/16 18:20	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:51	08/25/16 11:01	1
Aluminum	290		200	37	ug/L		08/22/16 07:51	08/25/16 11:01	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:51	08/25/16 11:01	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:51	08/25/16 11:01	1
Barium	47 J		200	3.2	ug/L		08/22/16 07:51	08/25/16 11:01	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:51	08/25/16 11:01	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:51	08/26/16 19:19	1
Calcium	87000 B		5000	89	ug/L		08/22/16 07:51	08/25/16 11:01	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:51	08/25/16 11:01	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-04

Date Collected: 08/18/16 08:06

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-4

Matrix: Water

Method: 6010C - Metals (ICP) - Total Recoverable (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.65	J	50	0.51	ug/L		08/22/16 07:51	08/25/16 11:01	1
Copper	6.1	J B	25	3.4	ug/L		08/22/16 07:51	08/25/16 11:01	1
Iron	580		100	41	ug/L		08/22/16 07:51	08/25/16 11:01	1
Lead	ND		10	3.1	ug/L		08/22/16 07:51	08/25/16 11:01	1
Magnesium	29000		5000	79	ug/L		08/22/16 07:51	08/25/16 11:01	1
Manganese	98		15	1.1	ug/L		08/22/16 07:51	08/25/16 11:01	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:51	08/25/16 11:01	1
Potassium	4000	J	5000	620	ug/L		08/22/16 07:51	08/25/16 11:01	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:51	08/25/16 11:01	1
Sodium	37000	B	5000	190	ug/L		08/22/16 07:51	08/25/16 11:01	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:51	08/25/16 11:01	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:51	08/25/16 11:01	1
Zinc	15	J	20	6.9	ug/L		08/22/16 07:51	08/25/16 11:01	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:53	08/31/16 07:00	1
Aluminum	ND		200	37	ug/L		08/22/16 07:53	08/31/16 07:00	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:53	08/31/16 07:00	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:53	08/31/16 07:00	1
Barium	47	J	200	3.2	ug/L		08/22/16 07:53	08/31/16 07:00	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:53	08/31/16 07:00	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:53	08/31/16 07:00	1
Calcium	89000		5000	89	ug/L		08/22/16 07:53	08/31/16 07:00	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:53	08/31/16 07:00	1
Cobalt	ND		50	0.51	ug/L		08/22/16 07:53	08/31/16 07:00	1
Copper	3.7	J	25	3.4	ug/L		08/22/16 07:53	08/31/16 07:00	1
Iron	ND		100	41	ug/L		08/22/16 07:53	08/31/16 07:00	1
Lead	ND		10	3.1	ug/L		08/22/16 07:53	08/31/16 07:00	1
Magnesium	30000		5000	79	ug/L		08/22/16 07:53	08/31/16 07:00	1
Manganese	43		15	1.1	ug/L		08/22/16 07:53	08/31/16 07:00	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:53	08/31/16 07:00	1
Potassium	4200	J	5000	620	ug/L		08/22/16 07:53	08/31/16 07:00	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:53	08/31/16 07:00	1
Sodium	37000		5000	190	ug/L		08/22/16 07:53	08/31/16 07:00	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:53	08/31/16 07:00	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:53	08/31/16 07:00	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:53	08/31/16 07:00	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:40	08/23/16 11:20	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:49	08/23/16 12:37	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-05

Date Collected: 08/18/16 08:12

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-5

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/23/16 18:46	1
Toluene	ND		5.0	3.6	ug/L			08/23/16 18:46	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/23/16 18:46	1
Xylenes, Total	ND		10	4.6	ug/L			08/23/16 18:46	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/23/16 18:46	1
o-Xylene	ND		5.0	2.9	ug/L			08/23/16 18:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	94		62 - 123					08/23/16 18:46	1
4-Bromofluorobenzene (Surr)	101		75 - 120					08/23/16 18:46	1
Dibromofluoromethane (Surr)	97		80 - 120					08/23/16 18:46	1
Toluene-d8 (Surr)	107		80 - 120					08/23/16 18:46	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:51	08/25/16 11:06	1
Aluminum	210		200	37	ug/L		08/22/16 07:51	08/25/16 11:06	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:51	08/25/16 11:06	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:51	08/25/16 11:06	1
Barium	44 J		200	3.2	ug/L		08/22/16 07:51	08/25/16 11:06	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:51	08/25/16 11:06	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:51	08/26/16 19:25	1
Calcium	95000 B		5000	89	ug/L		08/22/16 07:51	08/25/16 11:06	1
Chromium	0.69 J		5.0	0.61	ug/L		08/22/16 07:51	08/25/16 11:06	1
Cobalt	0.56 J		50	0.51	ug/L		08/22/16 07:51	08/25/16 11:06	1
Copper	4.0 JB		25	3.4	ug/L		08/22/16 07:51	08/25/16 11:06	1
Iron	410		100	41	ug/L		08/22/16 07:51	08/25/16 11:06	1
Lead	ND		10	3.1	ug/L		08/22/16 07:51	08/25/16 11:06	1
Magnesium	27000		5000	79	ug/L		08/22/16 07:51	08/25/16 11:06	1
Manganese	88		15	1.1	ug/L		08/22/16 07:51	08/25/16 11:06	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:51	08/25/16 11:06	1
Potassium	3800 J		5000	620	ug/L		08/22/16 07:51	08/25/16 11:06	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:51	08/25/16 11:06	1
Sodium	40000 B		5000	190	ug/L		08/22/16 07:51	08/25/16 11:06	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:51	08/25/16 11:06	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:51	08/25/16 11:06	1
Zinc	14 J		20	6.9	ug/L		08/22/16 07:51	08/25/16 11:06	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:53	08/31/16 07:05	1
Aluminum	ND		200	37	ug/L		08/22/16 07:53	08/31/16 07:05	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:53	08/31/16 07:05	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:53	08/31/16 07:05	1
Barium	45 J		200	3.2	ug/L		08/22/16 07:53	08/31/16 07:05	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:53	08/31/16 07:05	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:53	08/31/16 07:05	1
Calcium	100000		5000	89	ug/L		08/22/16 07:53	08/31/16 07:05	1
Chromium	0.76 J		5.0	0.61	ug/L		08/22/16 07:53	08/31/16 07:05	1
Cobalt	ND		50	0.51	ug/L		08/22/16 07:53	08/31/16 07:05	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-05

Date Collected: 08/18/16 08:12

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-5

Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Copper	ND		25	3.4	ug/L		08/22/16 07:53	08/31/16 07:05	1
Iron	ND		100	41	ug/L		08/22/16 07:53	08/31/16 07:05	1
Lead	ND		10	3.1	ug/L		08/22/16 07:53	08/31/16 07:05	1
Magnesium	29000		5000	79	ug/L		08/22/16 07:53	08/31/16 07:05	1
Manganese	42		15	1.1	ug/L		08/22/16 07:53	08/31/16 07:05	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:53	08/31/16 07:05	1
Potassium	4300 J		5000	620	ug/L		08/22/16 07:53	08/31/16 07:05	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:53	08/31/16 07:05	1
Sodium	43000		5000	190	ug/L		08/22/16 07:53	08/31/16 07:05	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:53	08/31/16 07:05	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:53	08/31/16 07:05	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:53	08/31/16 07:05	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:40	08/23/16 11:26	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:49	08/23/16 12:39	1

Client Sample ID: SW-06

Date Collected: 08/18/16 08:15

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-6

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/23/16 19:11	1
Toluene	ND		5.0	3.6	ug/L			08/23/16 19:11	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/23/16 19:11	1
Xylenes, Total	ND		10	4.6	ug/L			08/23/16 19:11	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/23/16 19:11	1
o-Xylene	ND		5.0	2.9	ug/L			08/23/16 19:11	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		62 - 123					08/23/16 19:11	1
4-Bromofluorobenzene (Surr)	97		75 - 120					08/23/16 19:11	1
Dibromofluoromethane (Surr)	99		80 - 120					08/23/16 19:11	1
Toluene-d8 (Surr)	105		80 - 120					08/23/16 19:11	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:51	08/25/16 11:11	1
Aluminum	370		200	37	ug/L		08/22/16 07:51	08/25/16 11:11	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:51	08/25/16 11:11	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:51	08/25/16 11:11	1
Barium	47 J		200	3.2	ug/L		08/22/16 07:51	08/25/16 11:11	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:51	08/25/16 11:11	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:51	08/26/16 19:30	1
Calcium	95000 B		5000	89	ug/L		08/22/16 07:51	08/25/16 11:11	1
Chromium	0.82 J		5.0	0.61	ug/L		08/22/16 07:51	08/25/16 11:11	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-06

Date Collected: 08/18/16 08:15

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-6

Matrix: Water

Method: 6010C - Metals (ICP) - Total Recoverable (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.86	J	50	0.51	ug/L		08/22/16 07:51	08/25/16 11:11	1
Copper	4.8	J B	25	3.4	ug/L		08/22/16 07:51	08/25/16 11:11	1
Iron	770		100	41	ug/L		08/22/16 07:51	08/25/16 11:11	1
Lead	3.4	J	10	3.1	ug/L		08/22/16 07:51	08/25/16 11:11	1
Magnesium	29000		5000	79	ug/L		08/22/16 07:51	08/25/16 11:11	1
Manganese	97		15	1.1	ug/L		08/22/16 07:51	08/25/16 11:11	1
Nickel	4.1	J	40	3.2	ug/L		08/22/16 07:51	08/25/16 11:11	1
Potassium	4100	J	5000	620	ug/L		08/22/16 07:51	08/25/16 11:11	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:51	08/25/16 11:11	1
Sodium	40000	B	5000	190	ug/L		08/22/16 07:51	08/25/16 11:11	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:51	08/25/16 11:11	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:51	08/25/16 11:11	1
Zinc	17	J	20	6.9	ug/L		08/22/16 07:51	08/25/16 11:11	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:53	08/31/16 07:11	1
Aluminum	37	J	200	37	ug/L		08/22/16 07:53	08/31/16 07:11	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:53	08/31/16 07:11	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:53	08/31/16 07:11	1
Barium	47	J	200	3.2	ug/L		08/22/16 07:53	08/31/16 07:11	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:53	08/31/16 07:11	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:53	08/31/16 07:11	1
Calcium	100000		5000	89	ug/L		08/22/16 07:53	08/31/16 07:11	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:53	08/31/16 07:11	1
Cobalt	ND		50	0.51	ug/L		08/22/16 07:53	08/31/16 07:11	1
Copper	ND		25	3.4	ug/L		08/22/16 07:53	08/31/16 07:11	1
Iron	ND		100	41	ug/L		08/22/16 07:53	08/31/16 07:11	1
Lead	ND		10	3.1	ug/L		08/22/16 07:53	08/31/16 07:11	1
Magnesium	30000		5000	79	ug/L		08/22/16 07:53	08/31/16 07:11	1
Manganese	45		15	1.1	ug/L		08/22/16 07:53	08/31/16 07:11	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:53	08/31/16 07:11	1
Potassium	4300	J	5000	620	ug/L		08/22/16 07:53	08/31/16 07:11	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:53	08/31/16 07:11	1
Sodium	42000		5000	190	ug/L		08/22/16 07:53	08/31/16 07:11	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:53	08/31/16 07:11	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:53	08/31/16 07:11	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:53	08/31/16 07:11	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:40	08/23/16 11:27	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:49	08/23/16 12:41	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-07

Date Collected: 08/18/16 08:30

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-7

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/23/16 12:51	1
Toluene	ND		5.0	3.6	ug/L			08/23/16 12:51	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/23/16 12:51	1
Xylenes, Total	ND		10	4.6	ug/L			08/23/16 12:51	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/23/16 12:51	1
o-Xylene	ND		5.0	2.9	ug/L			08/23/16 12:51	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	81		62 - 123					08/23/16 12:51	1
4-Bromofluorobenzene (Surr)	87		75 - 120					08/23/16 12:51	1
Dibromofluoromethane (Surr)	86		80 - 120					08/23/16 12:51	1
Toluene-d8 (Surr)	97		80 - 120					08/23/16 12:51	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:51	08/25/16 09:52	1
Aluminum	250		200	37	ug/L		08/22/16 07:51	08/25/16 09:52	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:51	08/25/16 09:52	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:51	08/25/16 09:52	1
Barium	47 J		200	3.2	ug/L		08/22/16 07:51	08/25/16 09:52	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:51	08/25/16 09:52	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:51	08/25/16 09:52	1
Calcium	88000 B		5000	89	ug/L		08/22/16 07:51	08/25/16 09:52	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:51	08/25/16 09:52	1
Cobalt	0.72 J		50	0.51	ug/L		08/22/16 07:51	08/25/16 09:52	1
Copper	5.0 JB		25	3.4	ug/L		08/22/16 07:51	08/25/16 09:52	1
Iron	510		100	41	ug/L		08/22/16 07:51	08/25/16 09:52	1
Lead	4.1 J		10	3.1	ug/L		08/22/16 07:51	08/25/16 09:52	1
Magnesium	29000		5000	79	ug/L		08/22/16 07:51	08/25/16 09:52	1
Manganese	100		15	1.1	ug/L		08/22/16 07:51	08/25/16 09:52	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:51	08/25/16 09:52	1
Potassium	4000 J		5000	620	ug/L		08/22/16 07:51	08/25/16 09:52	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:51	08/25/16 09:52	1
Sodium	37000 B		5000	190	ug/L		08/22/16 07:51	08/25/16 09:52	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:51	08/25/16 09:52	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:51	08/25/16 09:52	1
Zinc	16 J		20	6.9	ug/L		08/22/16 07:51	08/25/16 09:52	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:53	08/31/16 07:16	1
Aluminum	ND		200	37	ug/L		08/22/16 07:53	08/31/16 07:16	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:53	08/31/16 07:16	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:53	08/31/16 07:16	1
Barium	50 J		200	3.2	ug/L		08/22/16 07:53	08/31/16 07:16	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:53	08/31/16 07:16	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:53	08/31/16 07:16	1
Calcium	96000		5000	89	ug/L		08/22/16 07:53	08/31/16 07:16	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:53	08/31/16 07:16	1
Cobalt	ND		50	0.51	ug/L		08/22/16 07:53	08/31/16 07:16	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-07

Date Collected: 08/18/16 08:30

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-7

Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Copper	ND		25	3.4	ug/L		08/22/16 07:53	08/31/16 07:16	1
Iron	ND		100	41	ug/L		08/22/16 07:53	08/31/16 07:16	1
Lead	ND		10	3.1	ug/L		08/22/16 07:53	08/31/16 07:16	1
Magnesium	32000		5000	79	ug/L		08/22/16 07:53	08/31/16 07:16	1
Manganese	50		15	1.1	ug/L		08/22/16 07:53	08/31/16 07:16	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:53	08/31/16 07:16	1
Potassium	4400 J		5000	620	ug/L		08/22/16 07:53	08/31/16 07:16	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:53	08/31/16 07:16	1
Sodium	40000		5000	190	ug/L		08/22/16 07:53	08/31/16 07:16	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:53	08/31/16 07:16	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:53	08/31/16 07:16	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:53	08/31/16 07:16	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:40	08/23/16 11:29	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:49	08/23/16 12:43	1

Client Sample ID: SW-08

Date Collected: 08/18/16 08:33

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-8

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/25/16 11:08	1
Toluene	ND		5.0	3.6	ug/L			08/25/16 11:08	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/25/16 11:08	1
Xylenes, Total	ND		10	4.6	ug/L			08/25/16 11:08	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/25/16 11:08	1
o-Xylene	ND		5.0	2.9	ug/L			08/25/16 11:08	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	110		62 - 123					08/25/16 11:08	1
4-Bromofluorobenzene (Surr)	101		75 - 120					08/25/16 11:08	1
Dibromofluoromethane (Surr)	110		80 - 120					08/25/16 11:08	1
Toluene-d8 (Surr)	98		80 - 120					08/25/16 11:08	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:51	08/25/16 10:13	1
Aluminum	590		200	37	ug/L		08/22/16 07:51	08/25/16 10:13	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:51	08/25/16 10:13	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:51	08/25/16 10:13	1
Barium	48 J		200	3.2	ug/L		08/22/16 07:51	08/25/16 10:13	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:51	08/25/16 10:13	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:51	08/25/16 10:13	1
Calcium	87000 B		5000	89	ug/L		08/22/16 07:51	08/25/16 10:13	1
Chromium	0.83 J		5.0	0.61	ug/L		08/22/16 07:51	08/25/16 10:13	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-08

Date Collected: 08/18/16 08:33

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-8

Matrix: Water

Method: 6010C - Metals (ICP) - Total Recoverable (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	1.1	J	50	0.51	ug/L		08/22/16 07:51	08/25/16 10:13	1
Copper	5.4	J B	25	3.4	ug/L		08/22/16 07:51	08/25/16 10:13	1
Iron	1200		100	41	ug/L		08/22/16 07:51	08/25/16 10:13	1
Lead	3.9	J	10	3.1	ug/L		08/22/16 07:51	08/25/16 10:13	1
Magnesium	26000		5000	79	ug/L		08/22/16 07:51	08/25/16 10:13	1
Manganese	160		15	1.1	ug/L		08/22/16 07:51	08/25/16 10:13	1
Nickel	3.9	J	40	3.2	ug/L		08/22/16 07:51	08/25/16 10:13	1
Potassium	4000	J	5000	620	ug/L		08/22/16 07:51	08/25/16 10:13	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:51	08/25/16 10:13	1
Sodium	37000	B	5000	190	ug/L		08/22/16 07:51	08/25/16 10:13	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:51	08/25/16 10:13	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:51	08/25/16 10:13	1
Zinc	27		20	6.9	ug/L		08/22/16 07:51	08/25/16 10:13	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:53	08/31/16 07:47	1
Aluminum	ND		200	37	ug/L		08/22/16 07:53	08/31/16 07:47	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:53	08/31/16 07:47	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:53	08/31/16 07:47	1
Barium	44	J	200	3.2	ug/L		08/22/16 07:53	08/31/16 07:47	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:53	08/31/16 07:47	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:53	08/31/16 07:47	1
Calcium	91000		5000	89	ug/L		08/22/16 07:53	08/31/16 07:47	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:53	08/31/16 07:47	1
Cobalt	0.53	J	50	0.51	ug/L		08/22/16 07:53	08/31/16 07:47	1
Copper	ND		25	3.4	ug/L		08/22/16 07:53	08/31/16 07:47	1
Iron	ND		100	41	ug/L		08/22/16 07:53	08/31/16 07:47	1
Lead	ND		10	3.1	ug/L		08/22/16 07:53	08/31/16 07:47	1
Magnesium	28000		5000	79	ug/L		08/22/16 07:53	08/31/16 07:47	1
Manganese	39		15	1.1	ug/L		08/22/16 07:53	08/31/16 07:47	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:53	08/31/16 07:47	1
Potassium	4000	J	5000	620	ug/L		08/22/16 07:53	08/31/16 07:47	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:53	08/31/16 07:47	1
Sodium	39000		5000	190	ug/L		08/22/16 07:53	08/31/16 07:47	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:53	08/31/16 07:47	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:53	08/31/16 07:47	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:53	08/31/16 07:47	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:40	08/23/16 11:35	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:49	08/23/16 12:49	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-09

Date Collected: 08/18/16 08:35

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-9

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/23/16 19:36	1
Toluene	ND		5.0	3.6	ug/L			08/23/16 19:36	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/23/16 19:36	1
Xylenes, Total	ND		10	4.6	ug/L			08/23/16 19:36	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/23/16 19:36	1
o-Xylene	ND		5.0	2.9	ug/L			08/23/16 19:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		62 - 123					08/23/16 19:36	1
4-Bromofluorobenzene (Surr)	101		75 - 120					08/23/16 19:36	1
Dibromofluoromethane (Surr)	99		80 - 120					08/23/16 19:36	1
Toluene-d8 (Surr)	105		80 - 120					08/23/16 19:36	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:51	08/25/16 10:18	1
Aluminum	97 J		200	37	ug/L		08/22/16 07:51	08/25/16 10:18	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:51	08/25/16 10:18	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:51	08/25/16 10:18	1
Barium	46 J		200	3.2	ug/L		08/22/16 07:51	08/25/16 10:18	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:51	08/25/16 10:18	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:51	08/25/16 10:18	1
Calcium	89000 B		5000	89	ug/L		08/22/16 07:51	08/25/16 10:18	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:51	08/25/16 10:18	1
Cobalt	ND		50	0.51	ug/L		08/22/16 07:51	08/25/16 10:18	1
Copper	3.6 JB		25	3.4	ug/L		08/22/16 07:51	08/25/16 10:18	1
Iron	140		100	41	ug/L		08/22/16 07:51	08/25/16 10:18	1
Lead	ND		10	3.1	ug/L		08/22/16 07:51	08/25/16 10:18	1
Magnesium	30000		5000	79	ug/L		08/22/16 07:51	08/25/16 10:18	1
Manganese	27		15	1.1	ug/L		08/22/16 07:51	08/25/16 10:18	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:51	08/25/16 10:18	1
Potassium	4000 J		5000	620	ug/L		08/22/16 07:51	08/25/16 10:18	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:51	08/25/16 10:18	1
Sodium	37000 B		5000	190	ug/L		08/22/16 07:51	08/25/16 10:18	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:51	08/25/16 10:18	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:51	08/25/16 10:18	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:51	08/25/16 10:18	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:53	08/31/16 07:52	1
Aluminum	ND		200	37	ug/L		08/22/16 07:53	08/31/16 07:52	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:53	08/31/16 07:52	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:53	08/31/16 07:52	1
Barium	44 J		200	3.2	ug/L		08/22/16 07:53	08/31/16 07:52	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:53	08/31/16 07:52	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:53	08/31/16 07:52	1
Calcium	84000		5000	89	ug/L		08/22/16 07:53	08/31/16 07:52	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:53	08/31/16 07:52	1
Cobalt	ND		50	0.51	ug/L		08/22/16 07:53	08/31/16 07:52	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SW-09

Date Collected: 08/18/16 08:35

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-9

Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Copper	3.5	J	25	3.4	ug/L		08/22/16 07:53	08/31/16 07:52	1
Iron	ND		100	41	ug/L		08/22/16 07:53	08/31/16 07:52	1
Lead	ND		10	3.1	ug/L		08/22/16 07:53	08/31/16 07:52	1
Magnesium	28000		5000	79	ug/L		08/22/16 07:53	08/31/16 07:52	1
Manganese	55		15	1.1	ug/L		08/22/16 07:53	08/31/16 07:52	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:53	08/31/16 07:52	1
Potassium	3800	J	5000	620	ug/L		08/22/16 07:53	08/31/16 07:52	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:53	08/31/16 07:52	1
Sodium	35000		5000	190	ug/L		08/22/16 07:53	08/31/16 07:52	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:53	08/31/16 07:52	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:53	08/31/16 07:52	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:53	08/31/16 07:52	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:40	08/23/16 11:37	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:49	08/23/16 12:51	1

Client Sample ID: DUP-02

Date Collected: 08/18/16 00:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-10

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/25/16 11:33	1
Toluene	ND		5.0	3.6	ug/L			08/25/16 11:33	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/25/16 11:33	1
Xylenes, Total	ND		10	4.6	ug/L			08/25/16 11:33	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/25/16 11:33	1
o-Xylene	ND		5.0	2.9	ug/L			08/25/16 11:33	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	110		62 - 123					08/25/16 11:33	1
4-Bromofluorobenzene (Surr)	102		75 - 120					08/25/16 11:33	1
Dibromofluoromethane (Surr)	110		80 - 120					08/25/16 11:33	1
Toluene-d8 (Surr)	99		80 - 120					08/25/16 11:33	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:51	08/25/16 10:23	1
Aluminum	270		200	37	ug/L		08/22/16 07:51	08/25/16 10:23	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:51	08/25/16 10:23	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:51	08/25/16 10:23	1
Barium	50	J	200	3.2	ug/L		08/22/16 07:51	08/25/16 10:23	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:51	08/25/16 10:23	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:51	08/25/16 10:23	1
Calcium	91000	B	5000	89	ug/L		08/22/16 07:51	08/25/16 10:23	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:51	08/25/16 10:23	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: DUP-02

Date Collected: 08/18/16 00:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-10

Matrix: Water

Method: 6010C - Metals (ICP) - Total Recoverable (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.69	J	50	0.51	ug/L		08/22/16 07:51	08/25/16 10:23	1
Copper	7.3	J B	25	3.4	ug/L		08/22/16 07:51	08/25/16 10:23	1
Iron	550		100	41	ug/L		08/22/16 07:51	08/25/16 10:23	1
Lead	3.8	J	10	3.1	ug/L		08/22/16 07:51	08/25/16 10:23	1
Magnesium	31000		5000	79	ug/L		08/22/16 07:51	08/25/16 10:23	1
Manganese	110		15	1.1	ug/L		08/22/16 07:51	08/25/16 10:23	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:51	08/25/16 10:23	1
Potassium	4400	J	5000	620	ug/L		08/22/16 07:51	08/25/16 10:23	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:51	08/25/16 10:23	1
Sodium	39000	B	5000	190	ug/L		08/22/16 07:51	08/25/16 10:23	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:51	08/25/16 10:23	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:51	08/25/16 10:23	1
Zinc	18	J	20	6.9	ug/L		08/22/16 07:51	08/25/16 10:23	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:53	08/31/16 07:58	1
Aluminum	ND		200	37	ug/L		08/22/16 07:53	08/31/16 07:58	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:53	08/31/16 07:58	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:53	08/31/16 07:58	1
Barium	44	J	200	3.2	ug/L		08/22/16 07:53	08/31/16 07:58	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:53	08/31/16 07:58	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:53	08/31/16 07:58	1
Calcium	85000		5000	89	ug/L		08/22/16 07:53	08/31/16 07:58	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:53	08/31/16 07:58	1
Cobalt	ND		50	0.51	ug/L		08/22/16 07:53	08/31/16 07:58	1
Copper	ND		25	3.4	ug/L		08/22/16 07:53	08/31/16 07:58	1
Iron	ND		100	41	ug/L		08/22/16 07:53	08/31/16 07:58	1
Lead	ND		10	3.1	ug/L		08/22/16 07:53	08/31/16 07:58	1
Magnesium	28000		5000	79	ug/L		08/22/16 07:53	08/31/16 07:58	1
Manganese	42		15	1.1	ug/L		08/22/16 07:53	08/31/16 07:58	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:53	08/31/16 07:58	1
Potassium	3900	J	5000	620	ug/L		08/22/16 07:53	08/31/16 07:58	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:53	08/31/16 07:58	1
Sodium	36000		5000	190	ug/L		08/22/16 07:53	08/31/16 07:58	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:53	08/31/16 07:58	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:53	08/31/16 07:58	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:53	08/31/16 07:58	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:48	08/23/16 11:39	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:49	08/23/16 12:53	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: FB-02

Date Collected: 08/18/16 08:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-11

Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			08/23/16 12:26	1
Toluene	ND		5.0	3.6	ug/L			08/23/16 12:26	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/23/16 12:26	1
Xylenes, Total	ND		10	4.6	ug/L			08/23/16 12:26	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/23/16 12:26	1
o-Xylene	ND		5.0	2.9	ug/L			08/23/16 12:26	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	83		62 - 123					08/23/16 12:26	1
4-Bromofluorobenzene (Surr)	91		75 - 120					08/23/16 12:26	1
Dibromofluoromethane (Surr)	86		80 - 120					08/23/16 12:26	1
Toluene-d8 (Surr)	100		80 - 120					08/23/16 12:26	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:51	08/25/16 10:29	1
Aluminum	ND		200	37	ug/L		08/22/16 07:51	08/25/16 10:29	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:51	08/25/16 10:29	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:51	08/25/16 10:29	1
Barium	ND		200	3.2	ug/L		08/22/16 07:51	08/25/16 10:29	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:51	08/25/16 10:29	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:51	08/25/16 10:29	1
Calcium	ND		5000	89	ug/L		08/22/16 07:51	08/25/16 10:29	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:51	08/25/16 10:29	1
Cobalt	ND		50	0.51	ug/L		08/22/16 07:51	08/25/16 10:29	1
Copper	ND		25	3.4	ug/L		08/22/16 07:51	08/25/16 10:29	1
Iron	ND		100	41	ug/L		08/22/16 07:51	08/25/16 10:29	1
Lead	ND		10	3.1	ug/L		08/22/16 07:51	08/25/16 10:29	1
Magnesium	ND		5000	79	ug/L		08/22/16 07:51	08/25/16 10:29	1
Manganese	ND		15	1.1	ug/L		08/22/16 07:51	08/25/16 10:29	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:51	08/25/16 10:29	1
Potassium	ND		5000	620	ug/L		08/22/16 07:51	08/25/16 10:29	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:51	08/25/16 10:29	1
Sodium	ND		5000	190	ug/L		08/22/16 07:51	08/25/16 10:29	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:51	08/25/16 10:29	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:51	08/25/16 10:29	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:51	08/25/16 10:29	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		5.0	1.2	ug/L		08/22/16 07:53	08/31/16 08:03	1
Aluminum	ND		200	37	ug/L		08/22/16 07:53	08/31/16 08:03	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:53	08/31/16 08:03	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:53	08/31/16 08:03	1
Barium	ND		200	3.2	ug/L		08/22/16 07:53	08/31/16 08:03	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:53	08/31/16 08:03	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:53	08/31/16 08:03	1
Calcium	ND		5000	89	ug/L		08/22/16 07:53	08/31/16 08:03	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:53	08/31/16 08:03	1
Cobalt	ND		50	0.51	ug/L		08/22/16 07:53	08/31/16 08:03	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: FB-02

Date Collected: 08/18/16 08:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-11

Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Copper	ND		25	3.4	ug/L		08/22/16 07:53	08/31/16 08:03	1
Iron	ND		100	41	ug/L		08/22/16 07:53	08/31/16 08:03	1
Lead	ND		10	3.1	ug/L		08/22/16 07:53	08/31/16 08:03	1
Magnesium	ND		5000	79	ug/L		08/22/16 07:53	08/31/16 08:03	1
Manganese	ND		15	1.1	ug/L		08/22/16 07:53	08/31/16 08:03	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:53	08/31/16 08:03	1
Potassium	ND		5000	620	ug/L		08/22/16 07:53	08/31/16 08:03	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:53	08/31/16 08:03	1
Sodium	ND		5000	190	ug/L		08/22/16 07:53	08/31/16 08:03	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:53	08/31/16 08:03	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:53	08/31/16 08:03	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:53	08/31/16 08:03	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:48	08/23/16 11:41	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:49	08/23/16 12:59	1

Client Sample ID: SED-01

Date Collected: 08/18/16 10:30

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-12

Matrix: Solid

Percent Solids: 68.8

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		6.5	3.9	ug/Kg	✉	08/22/16 05:29	08/22/16 15:43	1
Toluene	ND		6.5	4.7	ug/Kg	✉	08/22/16 05:29	08/22/16 15:43	1
Ethylbenzene	ND		6.5	2.6	ug/Kg	✉	08/22/16 05:29	08/22/16 15:43	1
Xylenes, Total	ND		13	5.9	ug/Kg	✉	08/22/16 05:29	08/22/16 15:43	1
m-Xylene & p-Xylene	ND		6.5	2.5	ug/Kg	✉	08/22/16 05:29	08/22/16 15:43	1
o-Xylene	ND		6.5	3.8	ug/Kg	✉	08/22/16 05:29	08/22/16 15:43	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	91		52 - 124		08/22/16 05:29	08/22/16 15:43
4-Bromofluorobenzene (Surr)	93		63 - 120		08/22/16 05:29	08/22/16 15:43
Dibromofluoromethane (Surr)	94		68 - 121		08/22/16 05:29	08/22/16 15:43
Toluene-d8 (Surr)	109		72 - 127		08/22/16 05:29	08/22/16 15:43

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		0.65	0.22	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Aluminum	10000		26	9.9	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Arsenic	9.8		1.3	0.57	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Antimony	ND		1.3	0.46	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Barium	93		26	7.0	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Beryllium	0.89		0.52	0.14	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Cadmium	0.87		0.65	0.15	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Calcium	2300		650	180	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Chromium	15		0.65	0.17	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SED-01

Date Collected: 08/18/16 10:30

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-12

Matrix: Solid

Percent Solids: 68.8

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	14		6.5	1.5	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Copper	17		3.2	1.0	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Iron	24000		13	7.2	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Lead	16		1.3	0.43	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Magnesium	2500		650	170	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Manganese	450		1.9	0.53	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Nickel	26		5.2	0.22	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Potassium	1000		650	150	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Selenium	0.67 J		1.3	0.51	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Sodium	410 J		650	180	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Thallium	ND		2.6	0.65	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Vanadium	19		6.5	2.0	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1
Zinc	82		2.6	1.3	mg/Kg	✉	08/22/16 09:13	08/24/16 07:26	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.051	B	0.047	0.011	mg/Kg	✉	08/22/16 07:52	08/22/16 11:32	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	31.2		0.1	0.1	%			08/21/16 14:11	1
Percent Solids	68.8		0.1	0.1	%			08/21/16 14:11	1

Client Sample ID: SED-02

Date Collected: 08/18/16 10:45

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-13

Matrix: Solid

Percent Solids: 65.4

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		7.6	4.6	ug/Kg	✉	08/22/16 05:29	08/22/16 16:06	1
Toluene	ND		7.6	5.6	ug/Kg	✉	08/22/16 05:29	08/22/16 16:06	1
Ethylbenzene	ND		7.6	3.0	ug/Kg	✉	08/22/16 05:29	08/22/16 16:06	1
Xylenes, Total	ND		15	6.9	ug/Kg	✉	08/22/16 05:29	08/22/16 16:06	1
m-Xylene & p-Xylene	ND		7.6	3.0	ug/Kg	✉	08/22/16 05:29	08/22/16 16:06	1
o-Xylene	ND		7.6	4.4	ug/Kg	✉	08/22/16 05:29	08/22/16 16:06	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	92		52 - 124				08/22/16 05:29	08/22/16 16:06	1
4-Bromofluorobenzene (Surr)	92		63 - 120				08/22/16 05:29	08/22/16 16:06	1
Dibromofluoromethane (Surr)	95		68 - 121				08/22/16 05:29	08/22/16 16:06	1
Toluene-d8 (Surr)	103		72 - 127				08/22/16 05:29	08/22/16 16:06	1

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		0.72	0.24	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Aluminum	12000		29	11	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Arsenic	9.1		1.4	0.64	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Antimony	ND		1.4	0.51	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Barium	170		29	7.7	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Beryllium	1.2		0.58	0.15	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Cadmium	0.92		0.72	0.16	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SED-02

Date Collected: 08/18/16 10:45

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-13

Matrix: Solid

Percent Solids: 65.4

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	1600		720	200	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Chromium	18		0.72	0.19	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Cobalt	53		7.2	1.6	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Copper	19		3.6	1.1	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Iron	25000		14	8.0	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Lead	14		1.4	0.47	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Magnesium	2800		720	180	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Manganese	1000		2.2	0.59	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Nickel	65		5.8	0.24	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Potassium	1100		720	170	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Selenium	ND		1.4	0.57	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Sodium	ND		720	200	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Thallium	ND		2.9	0.72	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Vanadium	24		7.2	2.2	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1
Zinc	89		2.9	1.5	mg/Kg	✉	08/22/16 09:13	08/24/16 07:31	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.068	B	0.043	0.0096	mg/Kg	✉	08/22/16 07:52	08/22/16 11:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	34.6		0.1	0.1	%			08/21/16 14:11	1
Percent Solids	65.4		0.1	0.1	%			08/21/16 14:11	1

Client Sample ID: SED-03

Date Collected: 08/18/16 11:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-14

Matrix: Solid

Percent Solids: 74.5

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND	F1	5.5	3.3	ug/Kg	✉	08/22/16 05:29	08/22/16 08:58	1
Toluene	ND	F1	5.5	4.0	ug/Kg	✉	08/22/16 05:29	08/22/16 08:58	1
Ethylbenzene	ND	F1	5.5	2.2	ug/Kg	✉	08/22/16 05:29	08/22/16 08:58	1
Xylenes, Total	ND	F1	11	5.0	ug/Kg	✉	08/22/16 05:29	08/22/16 08:58	1
m-Xylene & p-Xylene	ND	F1	5.5	2.1	ug/Kg	✉	08/22/16 05:29	08/22/16 08:58	1
o-Xylene	ND	F1	5.5	3.2	ug/Kg	✉	08/22/16 05:29	08/22/16 08:58	1

Surrogate

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	85		52 - 124	08/22/16 05:29	08/22/16 08:58	1
4-Bromofluorobenzene (Surr)	91		63 - 120	08/22/16 05:29	08/22/16 08:58	1
Dibromofluoromethane (Surr)	92		68 - 121	08/22/16 05:29	08/22/16 08:58	1
Toluene-d8 (Surr)	102		72 - 127	08/22/16 05:29	08/22/16 08:58	1

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		0.67	0.22	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Aluminum	8400		27	10	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Arsenic	11		1.3	0.59	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Antimony	ND	F1	1.3	0.48	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Barium	120		27	7.2	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: SED-03

Date Collected: 08/18/16 11:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-14

Matrix: Solid

Percent Solids: 74.5

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.88		0.54	0.14	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Cadmium	0.99		0.67	0.15	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Calcium	1400		670	190	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Chromium	13		0.67	0.17	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Cobalt	14		6.7	1.5	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Copper	20		3.4	1.0	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Iron	25000		13	7.4	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Lead	19		1.3	0.44	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Magnesium	1900		670	170	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Manganese	380		2.0	0.54	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Nickel	23		5.4	0.23	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Potassium	870		670	160	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Selenium	ND		1.3	0.53	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Sodium	ND		670	190	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Thallium	ND		2.7	0.67	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Vanadium	18		6.7	2.1	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1
Zinc	70		2.7	1.4	mg/Kg	✉	08/22/16 09:13	08/24/16 07:01	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.075	B	0.039	0.0088	mg/Kg	✉	08/22/16 07:52	08/22/16 11:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	25.5		0.1	0.1	%			08/21/16 14:11	1
Percent Solids	74.5		0.1	0.1	%			08/21/16 14:11	1

Client Sample ID: DUP-03

Date Collected: 08/18/16 00:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-15

Matrix: Solid

Percent Solids: 63.5

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		7.3	4.4	ug/Kg	✉	08/23/16 06:17	08/23/16 10:24	1
Toluene	ND		7.3	5.3	ug/Kg	✉	08/23/16 06:17	08/23/16 10:24	1
Ethylbenzene	ND		7.3	2.9	ug/Kg	✉	08/23/16 06:17	08/23/16 10:24	1
Xylenes, Total	ND		15	6.6	ug/Kg	✉	08/23/16 06:17	08/23/16 10:24	1
m-Xylene & p-Xylene	ND		7.3	2.8	ug/Kg	✉	08/23/16 06:17	08/23/16 10:24	1
o-Xylene	ND		7.3	4.2	ug/Kg	✉	08/23/16 06:17	08/23/16 10:24	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	90		52 - 124				08/23/16 06:17	08/23/16 10:24	1
4-Bromofluorobenzene (Surr)	98		63 - 120				08/23/16 06:17	08/23/16 10:24	1
Dibromofluoromethane (Surr)	96		68 - 121				08/23/16 06:17	08/23/16 10:24	1
Toluene-d8 (Surr)	103		72 - 127				08/23/16 06:17	08/23/16 10:24	1

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		0.73	0.24	mg/Kg	✉	08/22/16 09:13	08/24/16 07:36	1
Aluminum	12000		29	11	mg/Kg	✉	08/22/16 09:13	08/24/16 07:36	1
Arsenic	17		1.5	0.64	mg/Kg	✉	08/22/16 09:13	08/24/16 07:36	1

TestAmerica Pittsburgh

Client Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Client Sample ID: DUP-03

Date Collected: 08/18/16 00:00

Date Received: 08/19/16 17:20

Lab Sample ID: 180-57777-15

Matrix: Solid

Percent Solids: 63.5

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		1.5	0.52	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Barium	120		29	7.8	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Beryllium	1.2		0.58	0.15	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Cadmium	2.1		0.73	0.16	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Calcium	1600		730	200	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Chromium	18		0.73	0.19	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Cobalt	85		7.3	1.6	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Copper	22		3.6	1.1	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Iron	27000		15	8.1	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Lead	17		1.5	0.48	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Magnesium	2800		730	190	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Manganese	1000		2.2	0.59	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Nickel	63		5.8	0.25	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Potassium	1100		730	170	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Selenium	0.88 J		1.5	0.58	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Sodium	ND		730	200	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Thallium	ND		2.9	0.73	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Vanadium	23		7.3	2.3	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1
Zinc	180		2.9	1.5	mg/Kg	⊗	08/22/16 09:13	08/24/16 07:36	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.15	B	0.043	0.0097	mg/Kg	⊗	08/22/16 07:52	08/22/16 11:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	36.5		0.1	0.1	%			08/21/16 15:18	1
Percent Solids	63.5		0.1	0.1	%			08/21/16 15:18	1

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 180-185600/7

Matrix: Solid

Analysis Batch: 185600

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	ND		5.0	3.0	ug/Kg			08/22/16 08:36	1
Toluene	ND		5.0	3.6	ug/Kg			08/22/16 08:36	1
Ethylbenzene	ND		5.0	2.0	ug/Kg			08/22/16 08:36	1
Xylenes, Total	ND		10	4.6	ug/Kg			08/22/16 08:36	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/Kg			08/22/16 08:36	1
o-Xylene	ND		5.0	2.9	ug/Kg			08/22/16 08:36	1

Surrogate	MB	MB	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
1,2-Dichloroethane-d4 (Surr)	105		52 - 124				08/22/16 08:36	1
4-Bromofluorobenzene (Surr)	99		63 - 120				08/22/16 08:36	1
Dibromofluoromethane (Surr)	95		68 - 121				08/22/16 08:36	1
Toluene-d8 (Surr)	100		72 - 127				08/22/16 08:36	1

Lab Sample ID: LCS 180-185600/3

Matrix: Solid

Analysis Batch: 185600

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike	LCS	LCS	D	%Rec	Limits
	Added	Result	Qualifier			
Benzene	40.0	40.5		ug/Kg	101	77 - 120
Toluene	40.0	42.1		ug/Kg	105	78 - 124
Ethylbenzene	40.0	43.2		ug/Kg	108	78 - 125
Xylenes, Total	80.0	82.7		ug/Kg	103	83 - 126
m-Xylene & p-Xylene	40.0	41.9		ug/Kg	105	75 - 126
o-Xylene	40.0	40.8		ug/Kg	102	83 - 127

Surrogate	LCS	LCS	%Recovery	Qualifier	Limits
	Result	Qualifier			
1,2-Dichloroethane-d4 (Surr)	102	52 - 124			
4-Bromofluorobenzene (Surr)	103	63 - 120			
Dibromofluoromethane (Surr)	100	68 - 121			
Toluene-d8 (Surr)	102	72 - 127			

Lab Sample ID: 180-57777-14 MS

Matrix: Solid

Analysis Batch: 185600

Client Sample ID: SED-03
Prep Type: Total/NA
Prep Batch: 185604

Analyte	Sample	Sample	Spike	MS	MS	D	%Rec	Limits	
	Result	Qualifier	Added	Result	Qualifier	Unit			
Benzene	ND	F1	40.4	51.3	F1	ug/Kg	⊗	127	77 - 120
Toluene	ND	F1	40.4	54.9	F1	ug/Kg	⊗	136	78 - 124
Ethylbenzene	ND	F1	40.4	55.5	F1	ug/Kg	⊗	137	78 - 125
Xylenes, Total	ND	F1	80.8	108	F1	ug/Kg	⊗	133	83 - 126
m-Xylene & p-Xylene	ND	F1	40.4	54.8	F1	ug/Kg	⊗	136	75 - 126
o-Xylene	ND	F1	40.4	52.8	F1	ug/Kg	⊗	131	83 - 127

Surrogate	MS	MS	%Recovery	Qualifier	Limits
	Result	Qualifier			
1,2-Dichloroethane-d4 (Surr)	86	52 - 124			
4-Bromofluorobenzene (Surr)	97	63 - 120			
Dibromofluoromethane (Surr)	101	68 - 121			

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 180-57777-14 MS

Matrix: Solid

Analysis Batch: 185600

Client Sample ID: SED-03

Prep Type: Total/NA

Prep Batch: 185604

Surrogate	MS		Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	108		72 - 127

Lab Sample ID: 180-57777-14 MSD

Matrix: Solid

Analysis Batch: 185600

Client Sample ID: SED-03

Prep Type: Total/NA

Prep Batch: 185604

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Benzene	ND	F1	44.2	58.3	F1	ug/Kg	⊗	132	77 - 120	13	20
Toluene	ND	F1	44.2	61.9	F1	ug/Kg	⊗	140	78 - 124	12	21
Ethylbenzene	ND	F1	44.2	63.2	F1	ug/Kg	⊗	143	78 - 125	13	21
Xylenes, Total	ND	F1	88.5	121	F1	ug/Kg	⊗	136	83 - 126	11	20
m-Xylene & p-Xylene	ND	F1	44.2	61.4	F1	ug/Kg	⊗	139	75 - 126	11	21
o-Xylene	ND	F1	44.2	59.1	F1	ug/Kg	⊗	134	83 - 127	11	20
Surrogate	MSD		MSD								
	%Recovery	Qualifier		Limits							
1,2-Dichloroethane-d4 (Surr)	90			52 - 124							
4-Bromofluorobenzene (Surr)	97			63 - 120							
Dibromofluoromethane (Surr)	100			68 - 121							
Toluene-d8 (Surr)	107			72 - 127							

Lab Sample ID: MB 180-185706/8

Matrix: Solid

Analysis Batch: 185706

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
	Result	Qualifier								
Benzene	ND		5.0	3.0	ug/Kg			08/23/16 09:34	1	
Toluene	ND		5.0	3.6	ug/Kg			08/23/16 09:34	1	
Ethylbenzene	ND		5.0	2.0	ug/Kg			08/23/16 09:34	1	
Xylenes, Total	ND		10	4.6	ug/Kg			08/23/16 09:34	1	
m-Xylene & p-Xylene	ND		5.0	1.9	ug/Kg			08/23/16 09:34	1	
o-Xylene	ND		5.0	2.9	ug/Kg			08/23/16 09:34	1	
Surrogate	MB		MB							
	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac	
1,2-Dichloroethane-d4 (Surr)	104		52 - 124					08/23/16 09:34	1	
4-Bromofluorobenzene (Surr)	104		63 - 120					08/23/16 09:34	1	
Dibromofluoromethane (Surr)	98		68 - 121					08/23/16 09:34	1	
Toluene-d8 (Surr)	100		72 - 127					08/23/16 09:34	1	

Lab Sample ID: LCS 180-185706/4

Matrix: Solid

Analysis Batch: 185706

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike		LCS	LCS	Unit	D	%Rec	Limits
	Added	Result						
Benzene	40.0	39.2			ug/Kg		98	77 - 120
Toluene	40.0	41.6			ug/Kg		104	78 - 124
Ethylbenzene	40.0	41.5			ug/Kg		104	78 - 125
Xylenes, Total	80.0	81.2			ug/Kg		102	83 - 126

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 180-185706/4

Matrix: Solid

Analysis Batch: 185706

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte

Analyte		Spike	LCS	LCS	Unit	D	%Rec	%Rec.
		Added	Result	Qualifier				
m-Xylene & p-Xylene		40.0	41.0		ug/Kg	102	75 - 126	
o-Xylene		40.0	40.2		ug/Kg	100	83 - 127	

LCS

LCS

Surrogate

%Recovery

Qualifier

Limits

1,2-Dichloroethane-d4 (Surr)

101

52 - 124

4-Bromofluorobenzene (Surr)

102

63 - 120

Dibromofluoromethane (Surr)

101

68 - 121

Toluene-d8 (Surr)

102

72 - 127

Lab Sample ID: MB 180-185721/9

Matrix: Water

Analysis Batch: 185721

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte

Analyte	Result	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
		Result	Qualifier							
Benzene	ND			5.0	3.0	ug/L			08/23/16 10:45	1
Toluene	ND			5.0	3.6	ug/L			08/23/16 10:45	1
Ethylbenzene	ND			5.0	2.0	ug/L			08/23/16 10:45	1
Xylenes, Total	ND			10	4.6	ug/L			08/23/16 10:45	1
m-Xylene & p-Xylene	ND			5.0	1.9	ug/L			08/23/16 10:45	1
o-Xylene	ND			5.0	2.9	ug/L			08/23/16 10:45	1

MB

MB

Surrogate

%Recovery

Qualifier

Limits

Prepared

Analyzed

Dil Fac

1,2-Dichloroethane-d4 (Surr)

86

62 - 123

08/23/16 10:45

1

4-Bromofluorobenzene (Surr)

92

75 - 120

08/23/16 10:45

1

Dibromofluoromethane (Surr)

93

80 - 120

08/23/16 10:45

1

Toluene-d8 (Surr)

101

80 - 120

08/23/16 10:45

1

Lab Sample ID: LCS 180-185721/6

Matrix: Water

Analysis Batch: 185721

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte

Analyte		Spike	LCS	LCS	Unit	D	%Rec	%Rec.
		Added	Result	Qualifier				
Benzene		40.0	38.9		ug/L		97	80 - 120
Toluene		40.0	37.9		ug/L		95	80 - 124
Ethylbenzene		40.0	38.3		ug/L		96	79 - 124
Xylenes, Total		80.0	78.0		ug/L		98	81 - 121
m-Xylene & p-Xylene		40.0	38.8		ug/L		97	78 - 124
o-Xylene		40.0	39.2		ug/L		98	78 - 124

LCS

LCS

Surrogate

%Recovery

Qualifier

Limits

1,2-Dichloroethane-d4 (Surr)

99

62 - 123

4-Bromofluorobenzene (Surr)

98

75 - 120

Dibromofluoromethane (Surr)

92

80 - 120

Toluene-d8 (Surr)

92

80 - 120

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 180-57777-7 MS

Matrix: Water

Analysis Batch: 185721

Client Sample ID: SW-07

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Benzene	ND		40.0	41.4		ug/L		104	80 - 120
Toluene	ND		40.0	41.9		ug/L		105	80 - 124
Ethylbenzene	ND		40.0	43.1		ug/L		108	79 - 124
Xylenes, Total	ND		80.0	85.4		ug/L		107	81 - 121
m-Xylene & p-Xylene	ND		40.0	43.3		ug/L		108	78 - 124
o-Xylene	ND		40.0	42.1		ug/L		105	78 - 124
Surrogate									
1,2-Dichloroethane-d4 (Surr)	96	%Recovery		Qualifer	Limits				
4-Bromofluorobenzene (Surr)	103				62 - 123				
Dibromofluoromethane (Surr)	92				75 - 120				
Toluene-d8 (Surr)	97				80 - 120				

Lab Sample ID: 180-57777-7 MSD

Matrix: Water

Analysis Batch: 185721

Client Sample ID: SW-07

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Benzene	ND		40.0	40.4		ug/L		101	80 - 120
Toluene	ND		40.0	42.0		ug/L		105	80 - 124
Ethylbenzene	ND		40.0	42.2		ug/L		106	79 - 124
Xylenes, Total	ND		80.0	85.0		ug/L		106	81 - 121
m-Xylene & p-Xylene	ND		40.0	43.0		ug/L		108	78 - 124
o-Xylene	ND		40.0	42.0		ug/L		105	78 - 124
Surrogate									
1,2-Dichloroethane-d4 (Surr)	102	%Recovery		Qualifer	Limits				
4-Bromofluorobenzene (Surr)	101				62 - 123				
Dibromofluoromethane (Surr)	91				75 - 120				
Toluene-d8 (Surr)	97				80 - 120				

Lab Sample ID: MB 180-186016/8

Matrix: Water

Analysis Batch: 186016

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	ND		5.0	3.0	ug/L			08/25/16 10:43	1
Toluene	ND		5.0	3.6	ug/L			08/25/16 10:43	1
Ethylbenzene	ND		5.0	2.0	ug/L			08/25/16 10:43	1
Xylenes, Total	ND		10	4.6	ug/L			08/25/16 10:43	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/L			08/25/16 10:43	1
o-Xylene	ND		5.0	2.9	ug/L			08/25/16 10:43	1
Surrogate									
1,2-Dichloroethane-d4 (Surr)	111	%Recovery		Qualifer	Limits			08/25/16 10:43	1
4-Bromofluorobenzene (Surr)	103				62 - 123			08/25/16 10:43	1
Dibromofluoromethane (Surr)	111				75 - 120			08/25/16 10:43	1
								08/25/16 10:43	1

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 180-186016/8

Matrix: Water

Analysis Batch: 186016

Client Sample ID: Method Blank
Prep Type: Total/NA

Surrogate	MB	MB	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)			99		80 - 120		08/25/16 10:43	1

Lab Sample ID: LCS 180-186016/5

Matrix: Water

Analysis Batch: 186016

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.	Limits
	Added	Result	Qualifier					
Benzene	40.0	35.9		ug/L		90	80 - 120	
Toluene	40.0	34.1		ug/L		85	80 - 124	
Ethylbenzene	40.0	37.4		ug/L		93	79 - 124	
Xylenes, Total	80.0	78.5		ug/L		98	81 - 121	
m-Xylene & p-Xylene	40.0	39.1		ug/L		98	78 - 124	
o-Xylene	40.0	39.4		ug/L		99	78 - 124	
Surrogate	LCS	LCS	Limits	Unit	D	%Rec	%Rec.	Limits
	%Recovery	Qualifier						
1,2-Dichloroethane-d4 (Surr)	102		62 - 123					
4-Bromofluorobenzene (Surr)	98		75 - 120					
Dibromofluoromethane (Surr)	100		80 - 120					
Toluene-d8 (Surr)	96		80 - 120					

Lab Sample ID: LCSD 180-186016/6

Matrix: Water

Analysis Batch: 186016

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	Limits	RPD	Limit
	Added	Result	Qualifier						
Benzene	40.0	36.9		ug/L		92	80 - 120	3	20
Toluene	40.0	34.4		ug/L		86	80 - 124	1	20
Ethylbenzene	40.0	38.3		ug/L		96	79 - 124	2	25
Xylenes, Total	80.0	81.7		ug/L		102	81 - 121	4	20
m-Xylene & p-Xylene	40.0	40.5		ug/L		101	78 - 124	4	24
o-Xylene	40.0	41.2		ug/L		103	78 - 124	4	22
Surrogate	LCSD	LCSD	Limits	Unit	D	%Rec	Limits	RPD	Limit
	%Recovery	Qualifier							
1,2-Dichloroethane-d4 (Surr)	101		62 - 123						
4-Bromofluorobenzene (Surr)	98		75 - 120						
Dibromofluoromethane (Surr)	101		80 - 120						
Toluene-d8 (Surr)	97		80 - 120						

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 180-185630/1-A

Matrix: Solid

Analysis Batch: 185879

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 185630

Analyte	MB	MB	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		ND		0.49	0.16	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Aluminum	ND		ND		19	7.4	mg/Kg		08/22/16 09:13	08/24/16 06:50	1

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: MB 180-185630/1-A

Matrix: Solid

Analysis Batch: 185879

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 185630

MB MB

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.97	0.43	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Antimony	ND		0.97	0.34	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Barium	ND		19	5.2	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Beryllium	ND		0.39	0.10	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Cadmium	ND		0.49	0.11	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Calcium	ND		490	130	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Chromium	ND		0.49	0.13	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Cobalt	ND		4.9	1.1	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Copper	ND		2.4	0.75	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Iron	ND		9.7	5.4	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Lead	ND		0.97	0.32	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Magnesium	ND		490	120	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Manganese	ND		1.5	0.39	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Nickel	ND		3.9	0.16	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Potassium	ND		490	120	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Selenium	ND		0.97	0.38	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Sodium	ND		490	140	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Thallium	ND		1.9	0.48	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Vanadium	ND		4.9	1.5	mg/Kg		08/22/16 09:13	08/24/16 06:50	1
Zinc	ND		1.9	0.99	mg/Kg		08/22/16 09:13	08/24/16 06:50	1

Lab Sample ID: LCS 180-185630/2-A

Matrix: Solid

Analysis Batch: 185879

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 185630

Analyte	Spike Added	LCS			D	%Rec	Limits
		Result	Qualifier	Unit			
Silver	4.72	4.59		mg/Kg		97	80 - 120
Aluminum	189	184		mg/Kg		98	80 - 120
Arsenic	47.2	45.0		mg/Kg		95	80 - 120
Antimony	47.2	46.1		mg/Kg		98	80 - 120
Barium	189	181		mg/Kg		96	80 - 120
Beryllium	4.72	4.76		mg/Kg		101	80 - 120
Cadmium	4.72	4.50		mg/Kg		96	80 - 120
Calcium	4720	4680		mg/Kg		99	80 - 120
Chromium	18.9	18.1		mg/Kg		96	80 - 120
Cobalt	47.2	46.5		mg/Kg		99	80 - 120
Copper	23.6	22.5		mg/Kg		95	80 - 120
Iron	94.3	96.6		mg/Kg		102	80 - 120
Lead	47.2	45.1		mg/Kg		96	80 - 120
Magnesium	4720	4600		mg/Kg		98	80 - 120
Manganese	47.2	45.4		mg/Kg		96	80 - 120
Nickel	47.2	46.9		mg/Kg		99	80 - 120
Potassium	4720	4570		mg/Kg		97	80 - 120
Selenium	47.2	45.4		mg/Kg		96	80 - 120
Sodium	4720	4620		mg/Kg		98	80 - 120
Thallium	47.2	43.5		mg/Kg		92	80 - 120
Vanadium	47.2	45.4		mg/Kg		96	80 - 120
Zinc	47.2	45.7		mg/Kg		97	80 - 120

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 180-57777-14 MS

Matrix: Solid

Analysis Batch: 185879

Client Sample ID: SED-03

Prep Type: Total/NA

Prep Batch: 185630

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Silver	ND		6.33	5.22		mg/Kg	⊗	82	75 - 125
Aluminum	8400		253	15800	4	mg/Kg	⊗	2916	75 - 125
Arsenic	11		63.3	65.4		mg/Kg	⊗	86	75 - 125
Antimony	ND	F1	63.3	37.6	F1	mg/Kg	⊗	59	75 - 125
Barium	120		253	348		mg/Kg	⊗	92	75 - 125
Beryllium	0.88		6.33	6.51		mg/Kg	⊗	89	75 - 125
Cadmium	0.99		6.33	6.26		mg/Kg	⊗	83	75 - 125
Calcium	1400		6330	7190		mg/Kg	⊗	92	75 - 125
Chromium	13		25.3	40.5		mg/Kg	⊗	107	75 - 125
Cobalt	14		63.3	76.3		mg/Kg	⊗	99	75 - 125
Copper	20		31.7	46.5		mg/Kg	⊗	82	75 - 125
Iron	25000		127	27900	4	mg/Kg	⊗	2580	75 - 125
Lead	19		63.3	77.4		mg/Kg	⊗	93	75 - 125
Magnesium	1900		6330	7880		mg/Kg	⊗	95	75 - 125
Manganese	380		63.3	471	4	mg/Kg	⊗	138	75 - 125
Nickel	23		63.3	90.6		mg/Kg	⊗	107	75 - 125
Potassium	870		6330	6810		mg/Kg	⊗	94	75 - 125
Selenium	ND		63.3	53.2		mg/Kg	⊗	84	75 - 125
Sodium	ND		6330	5490		mg/Kg	⊗	87	75 - 125
Thallium	ND		63.3	53.6		mg/Kg	⊗	85	75 - 125
Vanadium	18		63.3	77.5		mg/Kg	⊗	94	75 - 125
Zinc	70		63.3	139		mg/Kg	⊗	109	75 - 125

Lab Sample ID: 180-57777-14 MSD

Matrix: Solid

Analysis Batch: 185879

Client Sample ID: SED-03

Prep Type: Total/NA

Prep Batch: 185630

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
Silver	ND		6.52	5.48		mg/Kg	⊗	84	75 - 125	5	20
Aluminum	8400		261	15400	4	mg/Kg	⊗	2708	75 - 125	2	20
Arsenic	11		65.2	67.3		mg/Kg	⊗	86	75 - 125	3	20
Antimony	ND	F1	65.2	40.9	F1	mg/Kg	⊗	63	75 - 125	8	20
Barium	120		261	358		mg/Kg	⊗	93	75 - 125	3	20
Beryllium	0.88		6.52	6.80		mg/Kg	⊗	91	75 - 125	4	20
Cadmium	0.99		6.52	6.60		mg/Kg	⊗	86	75 - 125	5	20
Calcium	1400		6520	7140		mg/Kg	⊗	88	75 - 125	1	20
Chromium	13		26.1	41.9		mg/Kg	⊗	110	75 - 125	4	20
Cobalt	14		65.2	77.7		mg/Kg	⊗	98	75 - 125	2	20
Copper	20		32.6	47.9		mg/Kg	⊗	84	75 - 125	3	20
Iron	25000		130	28700	4	mg/Kg	⊗	3109	75 - 125	3	20
Lead	19		65.2	80.1		mg/Kg	⊗	94	75 - 125	3	20
Magnesium	1900		6520	8260		mg/Kg	⊗	98	75 - 125	5	20
Manganese	380		65.2	542	4	mg/Kg	⊗	243	75 - 125	14	20
Nickel	23		65.2	96.5		mg/Kg	⊗	113	75 - 125	6	20
Potassium	870		6520	7110		mg/Kg	⊗	96	75 - 125	4	20
Selenium	ND		65.2	55.3		mg/Kg	⊗	85	75 - 125	4	20
Sodium	ND		6520	5810		mg/Kg	⊗	89	75 - 125	6	20
Thallium	ND		65.2	55.8		mg/Kg	⊗	86	75 - 125	4	20

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 180-57777-14 MSD

Matrix: Solid

Analysis Batch: 185879

Client Sample ID: SED-03

Prep Type: Total/NA

Prep Batch: 185630

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Vanadium	18		65.2	80.3		mg/Kg	⊗	95	75 - 125	4	20
Zinc	70		65.2	148		mg/Kg	⊗	120	75 - 125	6	20

Lab Sample ID: MB 180-185618/1-A

Matrix: Water

Analysis Batch: 186107

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 185618

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Silver	ND		5.0	1.2	ug/L		08/22/16 07:51	08/25/16 09:42	1
Aluminum	ND		200	37	ug/L		08/22/16 07:51	08/25/16 09:42	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:51	08/25/16 09:42	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:51	08/25/16 09:42	1
Barium	ND		200	3.2	ug/L		08/22/16 07:51	08/25/16 09:42	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:51	08/25/16 09:42	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:51	08/25/16 09:42	1
Calcium	ND		5000	89	ug/L		08/22/16 07:51	08/25/16 09:42	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:51	08/25/16 09:42	1
Cobalt	ND		50	0.51	ug/L		08/22/16 07:51	08/25/16 09:42	1
Copper	ND		25	3.4	ug/L		08/22/16 07:51	08/25/16 09:42	1
Iron	ND		100	41	ug/L		08/22/16 07:51	08/25/16 09:42	1
Lead	ND		10	3.1	ug/L		08/22/16 07:51	08/25/16 09:42	1
Magnesium	ND		5000	79	ug/L		08/22/16 07:51	08/25/16 09:42	1
Manganese	ND		15	1.1	ug/L		08/22/16 07:51	08/25/16 09:42	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:51	08/25/16 09:42	1
Potassium	ND		5000	620	ug/L		08/22/16 07:51	08/25/16 09:42	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:51	08/25/16 09:42	1
Sodium	ND		5000	190	ug/L		08/22/16 07:51	08/25/16 09:42	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:51	08/25/16 09:42	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:51	08/25/16 09:42	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:51	08/25/16 09:42	1

Lab Sample ID: LCS 180-185618/2-A

Matrix: Water

Analysis Batch: 186107

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 185618

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Silver	50.0	48.8		ug/L		98	80 - 120
Aluminum	2000	1920		ug/L		96	80 - 120
Arsenic	500	486		ug/L		97	80 - 120
Antimony	500	492		ug/L		98	80 - 120
Barium	2000	1920		ug/L		96	80 - 120
Beryllium	50.0	49.9		ug/L		100	80 - 120
Cadmium	50.0	46.3		ug/L		93	80 - 120
Calcium	50000	48900		ug/L		98	80 - 120
Chromium	200	194		ug/L		97	80 - 120
Cobalt	500	501		ug/L		100	80 - 120
Copper	250	255		ug/L		102	80 - 120
Iron	1000	1010		ug/L		101	80 - 120
Lead	500	492		ug/L		98	80 - 120

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 180-185618/2-A

Matrix: Water

Analysis Batch: 186107

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 185618

%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Magnesium	50000	48700		ug/L		97	80 - 120
Manganese	500	477		ug/L		95	80 - 120
Nickel	500	511		ug/L		102	80 - 120
Potassium	50000	48700		ug/L		97	80 - 120
Selenium	500	486		ug/L		97	80 - 120
Sodium	50000	49700		ug/L		99	80 - 120
Thallium	500	486		ug/L		97	80 - 120
Vanadium	500	482		ug/L		96	80 - 120
Zinc	500	485		ug/L		97	80 - 120

Lab Sample ID: 180-57777-7 MS

Matrix: Water

Analysis Batch: 186107

Client Sample ID: SW-07

Prep Type: Total Recoverable

Prep Batch: 185618

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Silver	ND		50.0	48.6		ug/L		97	75 - 125
Aluminum	250		2000	2350		ug/L		105	75 - 125
Arsenic	ND		500	503		ug/L		101	75 - 125
Antimony	ND		500	505		ug/L		101	75 - 125
Barium	47 J		2000	1990		ug/L		97	75 - 125
Beryllium	ND		50.0	49.8		ug/L		100	75 - 125
Cadmium	ND		50.0	46.0		ug/L		92	75 - 125
Calcium	88000 B		50000	139000		ug/L		102	75 - 125
Chromium	ND		200	191		ug/L		96	75 - 125
Cobalt	0.72 J		500	501		ug/L		100	75 - 125
Copper	5.0 J B		250	258		ug/L		101	75 - 125
Iron	510		1000	1630		ug/L		112	75 - 125
Lead	4.1 J		500	495		ug/L		98	75 - 125
Magnesium	29000		50000	78500		ug/L		99	75 - 125
Manganese	100		500	587		ug/L		97	75 - 125
Nickel	ND		500	515		ug/L		103	75 - 125
Potassium	4000 J		50000	53700		ug/L		99	75 - 125
Selenium	ND		500	512		ug/L		102	75 - 125
Sodium	37000 B		50000	88100		ug/L		102	75 - 125
Thallium	ND		500	480		ug/L		96	75 - 125
Vanadium	ND		500	473		ug/L		95	75 - 125
Zinc	16 J		500	499		ug/L		96	75 - 125

Lab Sample ID: 180-57777-7 MSD

Matrix: Water

Analysis Batch: 186107

Client Sample ID: SW-07

Prep Type: Total Recoverable

Prep Batch: 185618

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Silver	ND		50.0	49.9		ug/L		100	75 - 125	3	20
Aluminum	250		2000	2560		ug/L		115	75 - 125	9	20
Arsenic	ND		500	522		ug/L		104	75 - 125	4	20
Antimony	ND		500	526		ug/L		105	75 - 125	4	20
Barium	47 J		2000	2010		ug/L		98	75 - 125	1	20
Beryllium	ND		50.0	50.1		ug/L		100	75 - 125	1	20

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 180-57777-7 MSD

Matrix: Water

Analysis Batch: 186107

Client Sample ID: SW-07

Prep Type: Total Recoverable

Prep Batch: 185618

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Cadmium	ND		50.0	47.9		ug/L	96	75 - 125	4	20	6
Calcium	88000	B	50000	137000		ug/L	97	75 - 125	2	20	7
Chromium	ND		200	196		ug/L	98	75 - 125	2	20	8
Cobalt	0.72	J	500	521		ug/L	104	75 - 125	4	20	9
Copper	5.0	J B	250	256		ug/L	100	75 - 125	1	20	10
Iron	510		1000	1760		ug/L	125	75 - 125	7	20	11
Lead	4.1	J	500	513		ug/L	102	75 - 125	4	20	12
Magnesium	29000		50000	77700		ug/L	98	75 - 125	1	20	13
Manganese	100		500	588		ug/L	97	75 - 125	0	20	
Nickel	ND		500	535		ug/L	107	75 - 125	4	20	
Potassium	4000	J	50000	53500		ug/L	99	75 - 125	0	20	
Selenium	ND		500	528		ug/L	106	75 - 125	3	20	
Sodium	37000	B	50000	87300		ug/L	101	75 - 125	1	20	
Thallium	ND		500	497		ug/L	99	75 - 125	4	20	
Vanadium	ND		500	489		ug/L	98	75 - 125	3	20	
Zinc	16	J	500	517		ug/L	100	75 - 125	4	20	

Lab Sample ID: MB 180-185619/1-A

Matrix: Water

Analysis Batch: 186588

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 185619

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Silver	ND		5.0	1.2	ug/L		08/22/16 07:53	08/31/16 06:34	1
Aluminum	ND		200	37	ug/L		08/22/16 07:53	08/31/16 06:34	1
Arsenic	ND		10	4.8	ug/L		08/22/16 07:53	08/31/16 06:34	1
Antimony	ND		10	3.2	ug/L		08/22/16 07:53	08/31/16 06:34	1
Barium	ND		200	3.2	ug/L		08/22/16 07:53	08/31/16 06:34	1
Beryllium	ND		4.0	0.42	ug/L		08/22/16 07:53	08/31/16 06:34	1
Cadmium	ND		5.0	0.20	ug/L		08/22/16 07:53	08/31/16 06:34	1
Calcium	ND		5000	89	ug/L		08/22/16 07:53	08/31/16 06:34	1
Chromium	ND		5.0	0.61	ug/L		08/22/16 07:53	08/31/16 06:34	1
Cobalt	ND		50	0.51	ug/L		08/22/16 07:53	08/31/16 06:34	1
Copper	ND		25	3.4	ug/L		08/22/16 07:53	08/31/16 06:34	1
Iron	ND		100	41	ug/L		08/22/16 07:53	08/31/16 06:34	1
Lead	ND		10	3.1	ug/L		08/22/16 07:53	08/31/16 06:34	1
Magnesium	ND		5000	79	ug/L		08/22/16 07:53	08/31/16 06:34	1
Manganese	ND		15	1.1	ug/L		08/22/16 07:53	08/31/16 06:34	1
Nickel	ND		40	3.2	ug/L		08/22/16 07:53	08/31/16 06:34	1
Potassium	ND		5000	620	ug/L		08/22/16 07:53	08/31/16 06:34	1
Selenium	ND		10	3.8	ug/L		08/22/16 07:53	08/31/16 06:34	1
Sodium	ND		5000	190	ug/L		08/22/16 07:53	08/31/16 06:34	1
Thallium	ND		20	2.6	ug/L		08/22/16 07:53	08/31/16 06:34	1
Vanadium	ND		50	6.9	ug/L		08/22/16 07:53	08/31/16 06:34	1
Zinc	ND		20	6.9	ug/L		08/22/16 07:53	08/31/16 06:34	1

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 180-185619/2-A

Matrix: Water

Analysis Batch: 186588

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 185619

%Rec.

Limits

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Silver	50.0	53.5		ug/L	107	80 - 120	
Aluminum	2000	2050		ug/L	102	80 - 120	
Arsenic	500	519		ug/L	104	80 - 120	
Antimony	500	540		ug/L	108	80 - 120	
Barium	2000	2010		ug/L	101	80 - 120	
Beryllium	50.0	50.6		ug/L	101	80 - 120	
Cadmium	50.0	50.0		ug/L	100	80 - 120	
Calcium	50000	50900		ug/L	102	80 - 120	
Chromium	200	199		ug/L	99	80 - 120	
Cobalt	500	521		ug/L	104	80 - 120	
Copper	250	252		ug/L	101	80 - 120	
Iron	1000	1040		ug/L	104	80 - 120	
Lead	500	515		ug/L	103	80 - 120	
Magnesium	50000	50400		ug/L	101	80 - 120	
Manganese	500	495		ug/L	99	80 - 120	
Nickel	500	519		ug/L	104	80 - 120	
Potassium	50000	50300		ug/L	101	80 - 120	
Selenium	500	542		ug/L	108	80 - 120	
Sodium	50000	51700		ug/L	103	80 - 120	
Thallium	500	507		ug/L	101	80 - 120	
Vanadium	500	519		ug/L	104	80 - 120	
Zinc	500	506		ug/L	101	80 - 120	

Lab Sample ID: 180-57777-7 MS

Matrix: Water

Analysis Batch: 186588

Client Sample ID: SW-07

Prep Type: Dissolved

Prep Batch: 185619

%Rec.

Limits

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Silver	ND		50.0	52.2		ug/L	104	75 - 125	
Aluminum	ND		2000	2040		ug/L	102	75 - 125	
Arsenic	ND		500	517		ug/L	103	75 - 125	
Antimony	ND		500	525		ug/L	105	75 - 125	
Barium	50 J		2000	2040		ug/L	99	75 - 125	
Beryllium	ND		50.0	49.8		ug/L	100	75 - 125	
Cadmium	ND		50.0	47.9		ug/L	96	75 - 125	
Calcium	96000		50000	140000		ug/L	88	75 - 125	
Chromium	ND		200	194		ug/L	97	75 - 125	
Cobalt	ND		500	512		ug/L	102	75 - 125	
Copper	ND		250	254		ug/L	102	75 - 125	
Iron	ND		1000	1030		ug/L	103	75 - 125	
Lead	ND		500	501		ug/L	100	75 - 125	
Magnesium	32000		50000	79100		ug/L	95	75 - 125	
Manganese	50		500	531		ug/L	96	75 - 125	
Nickel	ND		500	509		ug/L	102	75 - 125	
Potassium	4400 J		50000	54100		ug/L	99	75 - 125	
Selenium	ND		500	532		ug/L	106	75 - 125	
Sodium	40000		50000	88700		ug/L	98	75 - 125	
Thallium	ND		500	486		ug/L	97	75 - 125	

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 180-57777-7 MS

Matrix: Water

Analysis Batch: 186588

Client Sample ID: SW-07

Prep Type: Dissolved

Prep Batch: 185619

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	
	Result	Qualifier	Added	Result	Qualifier					
Vanadium	ND		500	506		ug/L		101	75 - 125	
Zinc	ND		500	489		ug/L		98	75 - 125	

Lab Sample ID: 180-57777-7 MSD

Matrix: Water

Analysis Batch: 186588

Client Sample ID: SW-07

Prep Type: Dissolved

Prep Batch: 185619

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Silver	ND		50.0	52.4		ug/L		105	75 - 125	0	20
Aluminum	ND		2000	2040		ug/L		102	75 - 125	0	20
Arsenic	ND		500	521		ug/L		104	75 - 125	1	20
Antimony	ND		500	535		ug/L		107	75 - 125	2	20
Barium	50	J	2000	2030		ug/L		99	75 - 125	0	20
Beryllium	ND		50.0	49.3		ug/L		99	75 - 125	1	20
Cadmium	ND		50.0	48.4		ug/L		97	75 - 125	1	20
Calcium	96000		50000	138000		ug/L		83	75 - 125	2	20
Chromium	ND		200	192		ug/L		96	75 - 125	1	20
Cobalt	ND		500	518		ug/L		104	75 - 125	1	20
Copper	ND		250	255		ug/L		102	75 - 125	0	20
Iron	ND		1000	1020		ug/L		102	75 - 125	0	20
Lead	ND		500	508		ug/L		102	75 - 125	1	20
Magnesium	32000		50000	78000		ug/L		92	75 - 125	1	20
Manganese	50		500	527		ug/L		95	75 - 125	1	20
Nickel	ND		500	516		ug/L		103	75 - 125	1	20
Potassium	4400	J	50000	53800		ug/L		99	75 - 125	1	20
Selenium	ND		500	541		ug/L		108	75 - 125	2	20
Sodium	40000		50000	87800		ug/L		96	75 - 125	1	20
Thallium	ND		500	492		ug/L		98	75 - 125	1	20
Vanadium	ND		500	507		ug/L		101	75 - 125	0	20
Zinc	ND		500	495		ug/L		99	75 - 125	1	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 180-185679/1-A

Matrix: Water

Analysis Batch: 185803

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 185679

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:40	08/23/16 11:43	1

Lab Sample ID: LCS 180-185679/2-A

Matrix: Water

Analysis Batch: 185803

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 185679

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Mercury	2.50	2.20		ug/L		88	80 - 120

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 180-57777-7 MS

Matrix: Water

Analysis Batch: 185803

Client Sample ID: SW-07

Prep Type: Total/NA

Prep Batch: 185679

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec.	Limits
Mercury	ND		1.00	0.899		ug/L		90	75 - 125

Lab Sample ID: 180-57777-7 MSD

Matrix: Water

Analysis Batch: 185803

Client Sample ID: SW-07

Prep Type: Total/NA

Prep Batch: 185679

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec.	RPD	Limit
Mercury	ND		1.00	0.907		ug/L		91	75 - 125	1 20

Lab Sample ID: MB 180-185680/1-A

Matrix: Water

Analysis Batch: 185803

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 185680

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.052	ug/L		08/22/16 13:49	08/23/16 12:24	1

Lab Sample ID: LCS 180-185680/2-A

Matrix: Water

Analysis Batch: 185803

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 185680

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	Limits
Mercury	2.50	2.14		ug/L		86	80 - 120

Lab Sample ID: 180-57777-7 MS

Matrix: Water

Analysis Batch: 185803

Client Sample ID: SW-07

Prep Type: Dissolved

Prep Batch: 185680

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec.	Limits
Mercury	ND		1.00	0.876		ug/L		88	75 - 125

Lab Sample ID: 180-57777-7 MSD

Matrix: Water

Analysis Batch: 185803

Client Sample ID: SW-07

Prep Type: Dissolved

Prep Batch: 185680

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec.	RPD	Limit
Mercury	ND		1.00	0.831		ug/L		83	75 - 125	5 20

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 180-185484/1-A

Matrix: Solid

Analysis Batch: 185691

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 185484

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00945	J	0.033	0.0074	mg/Kg		08/19/16 12:07	08/22/16 11:21	1

TestAmerica Pittsburgh

QC Sample Results

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Method: 7471B - Mercury (CVAA) (Continued)

Lab Sample ID: LCS 180-185484/2-A

Matrix: Solid

Analysis Batch: 185691

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 185484

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	0.417	0.430		mg/Kg		103	80 - 120

Lab Sample ID: 180-57777-14 MS

Matrix: Solid

Analysis Batch: 185691

Client Sample ID: SED-03

Prep Type: Total/NA

Prep Batch: 185484

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Mercury	0.075	B	0.200	0.278		mg/Kg	⊗	101	80 - 120

Lab Sample ID: 180-57777-14 MSD

Matrix: Solid

Analysis Batch: 185691

Client Sample ID: SED-03

Prep Type: Total/NA

Prep Batch: 185484

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	RPD	RPD Limit
Mercury	0.075	B	0.210	0.294		mg/Kg	⊗	105	80 - 120	6 20

Method: 2540G - SM 2540G

Lab Sample ID: 180-57777-15 DU

Matrix: Solid

Analysis Batch: 185581

Client Sample ID: DUP-03

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU			D	RPD	RPD Limit
			Result	Qualifier	Unit			
Percent Moisture	36.5		36.3		%			0.6 20
Percent Solids	63.5		63.7		%			0.3 20

TestAmerica Pittsburgh

QC Association Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

GC/MS VOA

Analysis Batch: 185600

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-12	SED-01	Total/NA	Solid	8260C	185604
180-57777-13	SED-02	Total/NA	Solid	8260C	185604
180-57777-14	SED-03	Total/NA	Solid	8260C	185604
MB 180-185600/7	Method Blank	Total/NA	Solid	8260C	
LCS 180-185600/3	Lab Control Sample	Total/NA	Solid	8260C	
180-57777-14 MS	SED-03	Total/NA	Solid	8260C	185604
180-57777-14 MSD	SED-03	Total/NA	Solid	8260C	185604

Prep Batch: 185604

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-12	SED-01	Total/NA	Solid	5035	
180-57777-13	SED-02	Total/NA	Solid	5035	
180-57777-14	SED-03	Total/NA	Solid	5035	
180-57777-14 MS	SED-03	Total/NA	Solid	5035	
180-57777-14 MSD	SED-03	Total/NA	Solid	5035	

Analysis Batch: 185706

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-15	DUP-03	Total/NA	Solid	8260C	185712
MB 180-185706/8	Method Blank	Total/NA	Solid	8260C	
LCS 180-185706/4	Lab Control Sample	Total/NA	Solid	8260C	

Prep Batch: 185712

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-15	DUP-03	Total/NA	Solid	5035	

Analysis Batch: 185721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-1	SW-01	Total/NA	Water	8260C	
180-57777-2	SW-02	Total/NA	Water	8260C	
180-57777-3	SW-03	Total/NA	Water	8260C	
180-57777-4	SW-04	Total/NA	Water	8260C	
180-57777-5	SW-05	Total/NA	Water	8260C	
180-57777-6	SW-06	Total/NA	Water	8260C	
180-57777-7	SW-07	Total/NA	Water	8260C	
180-57777-9	SW-09	Total/NA	Water	8260C	
180-57777-11	FB-02	Total/NA	Water	8260C	
MB 180-185721/9	Method Blank	Total/NA	Water	8260C	
LCS 180-185721/6	Lab Control Sample	Total/NA	Water	8260C	
180-57777-7 MS	SW-07	Total/NA	Water	8260C	
180-57777-7 MSD	SW-07	Total/NA	Water	8260C	

Analysis Batch: 186016

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-8	SW-08	Total/NA	Water	8260C	
180-57777-10	DUP-02	Total/NA	Water	8260C	
MB 180-186016/8	Method Blank	Total/NA	Water	8260C	
LCS 180-186016/5	Lab Control Sample	Total/NA	Water	8260C	
LCSD 180-186016/6	Lab Control Sample Dup	Total/NA	Water	8260C	

TestAmerica Pittsburgh

QC Association Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Metals

Prep Batch: 185484

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-12	SED-01	Total/NA	Solid	7471B	5
180-57777-13	SED-02	Total/NA	Solid	7471B	6
180-57777-14	SED-03	Total/NA	Solid	7471B	7
180-57777-15	DUP-03	Total/NA	Solid	7471B	8
MB 180-185484/1-A	Method Blank	Total/NA	Solid	7471B	9
LCS 180-185484/2-A	Lab Control Sample	Total/NA	Solid	7471B	10
180-57777-14 MS	SED-03	Total/NA	Solid	7471B	11
180-57777-14 MSD	SED-03	Total/NA	Solid	7471B	12

Prep Batch: 185618

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-1	SW-01	Total Recoverable	Water	3005A	10
180-57777-2	SW-02	Total Recoverable	Water	3005A	11
180-57777-3	SW-03	Total Recoverable	Water	3005A	12
180-57777-4	SW-04	Total Recoverable	Water	3005A	13
180-57777-5	SW-05	Total Recoverable	Water	3005A	
180-57777-6	SW-06	Total Recoverable	Water	3005A	
180-57777-7	SW-07	Total Recoverable	Water	3005A	
180-57777-8	SW-08	Total Recoverable	Water	3005A	
180-57777-9	SW-09	Total Recoverable	Water	3005A	
180-57777-10	DUP-02	Total Recoverable	Water	3005A	
180-57777-11	FB-02	Total Recoverable	Water	3005A	
MB 180-185618/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-185618/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-57777-7 MS	SW-07	Total Recoverable	Water	3005A	
180-57777-7 MSD	SW-07	Total Recoverable	Water	3005A	

Prep Batch: 185619

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-1	SW-01	Dissolved	Water	3005A	
180-57777-2	SW-02	Dissolved	Water	3005A	
180-57777-3	SW-03	Dissolved	Water	3005A	
180-57777-4	SW-04	Dissolved	Water	3005A	
180-57777-5	SW-05	Dissolved	Water	3005A	
180-57777-6	SW-06	Dissolved	Water	3005A	
180-57777-7	SW-07	Dissolved	Water	3005A	
180-57777-8	SW-08	Dissolved	Water	3005A	
180-57777-9	SW-09	Dissolved	Water	3005A	
180-57777-10	DUP-02	Dissolved	Water	3005A	
180-57777-11	FB-02	Dissolved	Water	3005A	
MB 180-185619/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-185619/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-57777-7 MS	SW-07	Dissolved	Water	3005A	
180-57777-7 MSD	SW-07	Dissolved	Water	3005A	

Prep Batch: 185630

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-12	SED-01	Total/NA	Solid	3050B	
180-57777-13	SED-02	Total/NA	Solid	3050B	
180-57777-14	SED-03	Total/NA	Solid	3050B	
180-57777-15	DUP-03	Total/NA	Solid	3050B	

TestAmerica Pittsburgh

QC Association Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Metals (Continued)

Prep Batch: 185630 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 180-185630/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 180-185630/2-A	Lab Control Sample	Total/NA	Solid	3050B	
180-57777-14 MS	SED-03	Total/NA	Solid	3050B	
180-57777-14 MSD	SED-03	Total/NA	Solid	3050B	

Prep Batch: 185679

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-1	SW-01	Total/NA	Water	7470A	
180-57777-2	SW-02	Total/NA	Water	7470A	
180-57777-3	SW-03	Total/NA	Water	7470A	
180-57777-4	SW-04	Total/NA	Water	7470A	
180-57777-5	SW-05	Total/NA	Water	7470A	
180-57777-6	SW-06	Total/NA	Water	7470A	
180-57777-7	SW-07	Total/NA	Water	7470A	
180-57777-8	SW-08	Total/NA	Water	7470A	
180-57777-9	SW-09	Total/NA	Water	7470A	
180-57777-10	DUP-02	Total/NA	Water	7470A	
180-57777-11	FB-02	Total/NA	Water	7470A	
MB 180-185679/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-185679/2-A	Lab Control Sample	Total/NA	Water	7470A	
180-57777-7 MS	SW-07	Total/NA	Water	7470A	
180-57777-7 MSD	SW-07	Total/NA	Water	7470A	

Prep Batch: 185680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-1	SW-01	Dissolved	Water	7470A	
180-57777-2	SW-02	Dissolved	Water	7470A	
180-57777-3	SW-03	Dissolved	Water	7470A	
180-57777-4	SW-04	Dissolved	Water	7470A	
180-57777-5	SW-05	Dissolved	Water	7470A	
180-57777-6	SW-06	Dissolved	Water	7470A	
180-57777-7	SW-07	Dissolved	Water	7470A	
180-57777-8	SW-08	Dissolved	Water	7470A	
180-57777-9	SW-09	Dissolved	Water	7470A	
180-57777-10	DUP-02	Dissolved	Water	7470A	
180-57777-11	FB-02	Dissolved	Water	7470A	
MB 180-185680/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-185680/2-A	Lab Control Sample	Total/NA	Water	7470A	
180-57777-7 MS	SW-07	Dissolved	Water	7470A	
180-57777-7 MSD	SW-07	Dissolved	Water	7470A	

Analysis Batch: 185691

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-12	SED-01	Total/NA	Solid	7471B	
180-57777-13	SED-02	Total/NA	Solid	7471B	
180-57777-14	SED-03	Total/NA	Solid	7471B	
180-57777-15	DUP-03	Total/NA	Solid	7471B	
MB 180-185484/1-A	Method Blank	Total/NA	Solid	7471B	
LCS 180-185484/2-A	Lab Control Sample	Total/NA	Solid	7471B	
180-57777-14 MS	SED-03	Total/NA	Solid	7471B	
180-57777-14 MSD	SED-03	Total/NA	Solid	7471B	

TestAmerica Pittsburgh

QC Association Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Analysis Batch: 185803

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-1	SW-01	Dissolved	Water	7470A	185680
180-57777-1	SW-01	Total/NA	Water	7470A	185679
180-57777-2	SW-02	Dissolved	Water	7470A	185680
180-57777-2	SW-02	Total/NA	Water	7470A	185679
180-57777-3	SW-03	Dissolved	Water	7470A	185680
180-57777-3	SW-03	Total/NA	Water	7470A	185679
180-57777-4	SW-04	Dissolved	Water	7470A	185680
180-57777-4	SW-04	Total/NA	Water	7470A	185679
180-57777-5	SW-05	Dissolved	Water	7470A	185680
180-57777-5	SW-05	Total/NA	Water	7470A	185679
180-57777-6	SW-06	Dissolved	Water	7470A	185680
180-57777-6	SW-06	Total/NA	Water	7470A	185679
180-57777-7	SW-07	Dissolved	Water	7470A	185680
180-57777-7	SW-07	Total/NA	Water	7470A	185679
180-57777-8	SW-08	Dissolved	Water	7470A	185680
180-57777-8	SW-08	Total/NA	Water	7470A	185679
180-57777-9	SW-09	Dissolved	Water	7470A	185680
180-57777-9	SW-09	Total/NA	Water	7470A	185679
180-57777-10	DUP-02	Dissolved	Water	7470A	185680
180-57777-10	DUP-02	Total/NA	Water	7470A	185679
180-57777-11	FB-02	Dissolved	Water	7470A	185680
180-57777-11	FB-02	Total/NA	Water	7470A	185679
MB 180-185679/1-A	Method Blank	Total/NA	Water	7470A	185679
MB 180-185680/1-A	Method Blank	Total/NA	Water	7470A	185680
LCS 180-185679/2-A	Lab Control Sample	Total/NA	Water	7470A	185679
LCS 180-185680/2-A	Lab Control Sample	Total/NA	Water	7470A	185680
180-57777-7 MS	SW-07	Dissolved	Water	7470A	185680
180-57777-7 MS	SW-07	Total/NA	Water	7470A	185679
180-57777-7 MSD	SW-07	Dissolved	Water	7470A	185680
180-57777-7 MSD	SW-07	Total/NA	Water	7470A	185679

Analysis Batch: 185879

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-12	SED-01	Total/NA	Solid	6010C	185630
180-57777-13	SED-02	Total/NA	Solid	6010C	185630
180-57777-14	SED-03	Total/NA	Solid	6010C	185630
180-57777-15	DUP-03	Total/NA	Solid	6010C	185630
MB 180-185630/1-A	Method Blank	Total/NA	Solid	6010C	185630
LCS 180-185630/2-A	Lab Control Sample	Total/NA	Solid	6010C	185630
180-57777-14 MS	SED-03	Total/NA	Solid	6010C	185630
180-57777-14 MSD	SED-03	Total/NA	Solid	6010C	185630

Analysis Batch: 186107

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-1	SW-01	Total Recoverable	Water	6010C	185618
180-57777-2	SW-02	Total Recoverable	Water	6010C	185618
180-57777-3	SW-03	Total Recoverable	Water	6010C	185618
180-57777-4	SW-04	Total Recoverable	Water	6010C	185618
180-57777-5	SW-05	Total Recoverable	Water	6010C	185618
180-57777-6	SW-06	Total Recoverable	Water	6010C	185618
180-57777-7	SW-07	Total Recoverable	Water	6010C	185618
180-57777-8	SW-08	Total Recoverable	Water	6010C	185618
180-57777-9	SW-09	Total Recoverable	Water	6010C	185618

TestAmerica Pittsburgh

QC Association Summary

Client: Tetra Tech, Inc.

Project/Site: Lyondell Beaver Valley Plant Groundwater

TestAmerica Job ID: 180-57777-1

Metals (Continued)

Analysis Batch: 186107 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-10	DUP-02	Total Recoverable	Water	6010C	185618
180-57777-11	FB-02	Total Recoverable	Water	6010C	185618
MB 180-185618/1-A	Method Blank	Total Recoverable	Water	6010C	185618
LCS 180-185618/2-A	Lab Control Sample	Total Recoverable	Water	6010C	185618
180-57777-7 MS	SW-07	Total Recoverable	Water	6010C	185618
180-57777-7 MSD	SW-07	Total Recoverable	Water	6010C	185618

Analysis Batch: 186270

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-1	SW-01	Total Recoverable	Water	6010C	185618
180-57777-2	SW-02	Total Recoverable	Water	6010C	185618
180-57777-3	SW-03	Total Recoverable	Water	6010C	185618
180-57777-4	SW-04	Total Recoverable	Water	6010C	185618
180-57777-5	SW-05	Total Recoverable	Water	6010C	185618
180-57777-6	SW-06	Total Recoverable	Water	6010C	185618

Analysis Batch: 186588

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-1	SW-01	Dissolved	Water	6010C	185619
180-57777-2	SW-02	Dissolved	Water	6010C	185619
180-57777-3	SW-03	Dissolved	Water	6010C	185619
180-57777-4	SW-04	Dissolved	Water	6010C	185619
180-57777-5	SW-05	Dissolved	Water	6010C	185619
180-57777-6	SW-06	Dissolved	Water	6010C	185619
180-57777-7	SW-07	Dissolved	Water	6010C	185619
180-57777-8	SW-08	Dissolved	Water	6010C	185619
180-57777-9	SW-09	Dissolved	Water	6010C	185619
180-57777-10	DUP-02	Dissolved	Water	6010C	185619
180-57777-11	FB-02	Dissolved	Water	6010C	185619
MB 180-185619/1-A	Method Blank	Total Recoverable	Water	6010C	185619
LCS 180-185619/2-A	Lab Control Sample	Total Recoverable	Water	6010C	185619
180-57777-7 MS	SW-07	Dissolved	Water	6010C	185619
180-57777-7 MSD	SW-07	Dissolved	Water	6010C	185619

General Chemistry

Analysis Batch: 185580

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-12	SED-01	Total/NA	Solid	2540G	
180-57777-13	SED-02	Total/NA	Solid	2540G	
180-57777-14	SED-03	Total/NA	Solid	2540G	

Analysis Batch: 185581

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-57777-15	DUP-03	Total/NA	Solid	2540G	
180-57777-15 DU	DUP-03	Total/NA	Solid	2540G	

TestAmerica Pittsburgh

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.

ZAI 2010/00040

Pittsburgh, PA 15238
Phone: 412.963.7058 Fax: 412.963.2470

ESTHETIC DENTISTRY
301 Alpha Drive

Chain of Custody Record

301 Alpha Drive

146834

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAI-8210 (0713)

Phone: 412.963.7058 Fax: 412.963.2470

Page 57 of 58

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 180-57777-1

Login Number: 57777

List Source: TestAmerica Pittsburgh

List Number: 1

Creator: Watson, Debbie

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	False	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ATTACHMENT 4
THERMAL IMAGING REPORT

Thermal Imaging Results



Company	Tetra Tech 661 Andersen Drive Pittsburgh, PA 15220	Tester: Keith Henn and Jon Aglio Phone: 412-921-8398 E-Mail: Keith.Henn@tetrtech.com
Device	testo 875-2	Serial No.: 2103530 Lens: Standard 32°
Customer	Lyondell Environmental Custodial Trust	Measuring Site: Former Lyondell Beaver Valley Site Route 18 Potter Township, Pennsylvania Measuring Date: 8/18/2016
Task	<p>A handheld thermal imaging camera (Testo 875 series) was utilized on 8/18/16 to collect thermal images from a boat along Raccoon Creek, adjacent to the Raccoon Creek disposal area.</p> <p>This examination was carried out according to EN 13187 using a thermal imager.</p>	

Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).

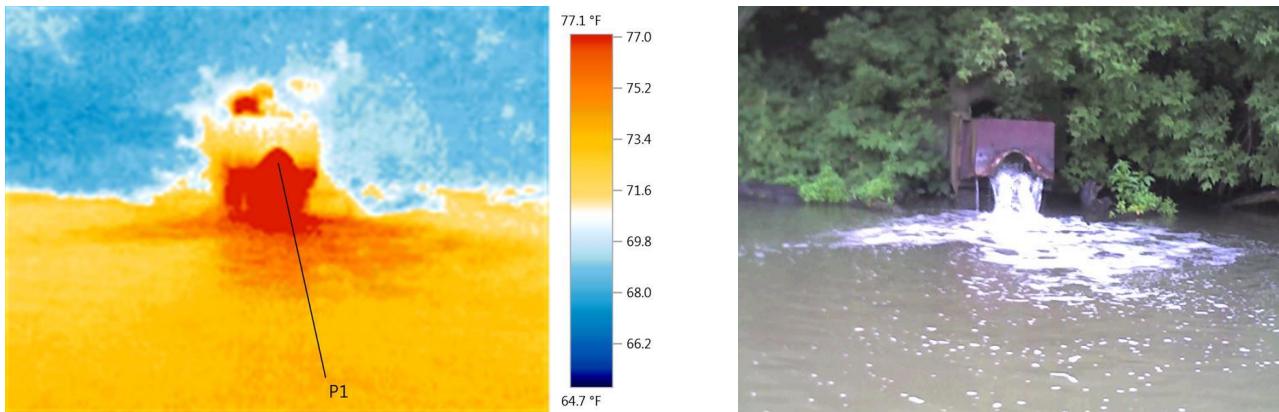


Thermal Imaging Results

File:
IV_00823.BMT

Date:
8/18/2016

Measuring Time:
7:14:32 AM

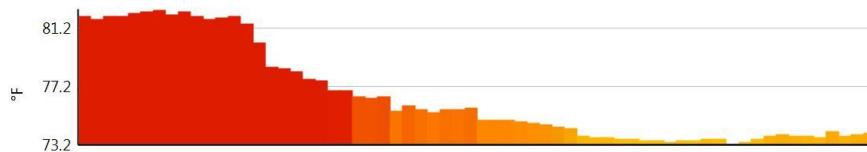


Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Profile line:

Minimum: 73.3 °F Maximum: 82.4 °F Average: 76.5 °F



Remarks:

Image location 825a

BASF outfall

Temperature of water discharge at the outfall is ~82.9 degrees F.

Temperature of Raccoon Creek surface is ~73.0 degrees F.

Temperature of shaded shore line under brush cover is ~68 degrees F.

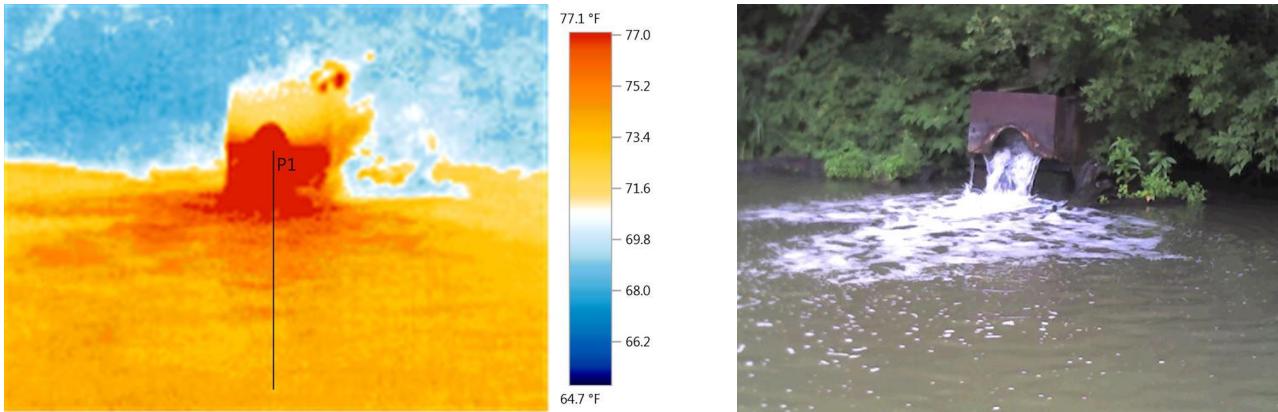
NOTE: Reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00824.BMT

Date:
8/18/2016

Measuring Time:
7:14:46 AM

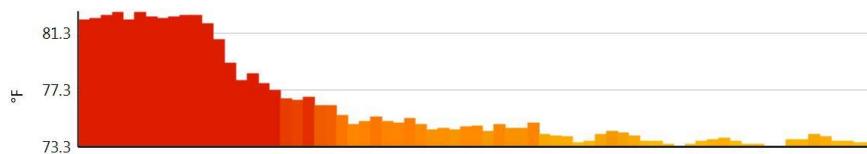


Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Profile line:

Minimum: 73.4 °F Maximum: 82.8 °F Average: 76.1 °F



Remarks:

Image location 825b

BASF outfall

Temperature of water discharge at the outfall is ~82.9 degrees F.

Temperature of Raccoon Creek surface is ~73.0 degrees F.

Temperature of shaded shore line under brush cover is ~68 degrees F.

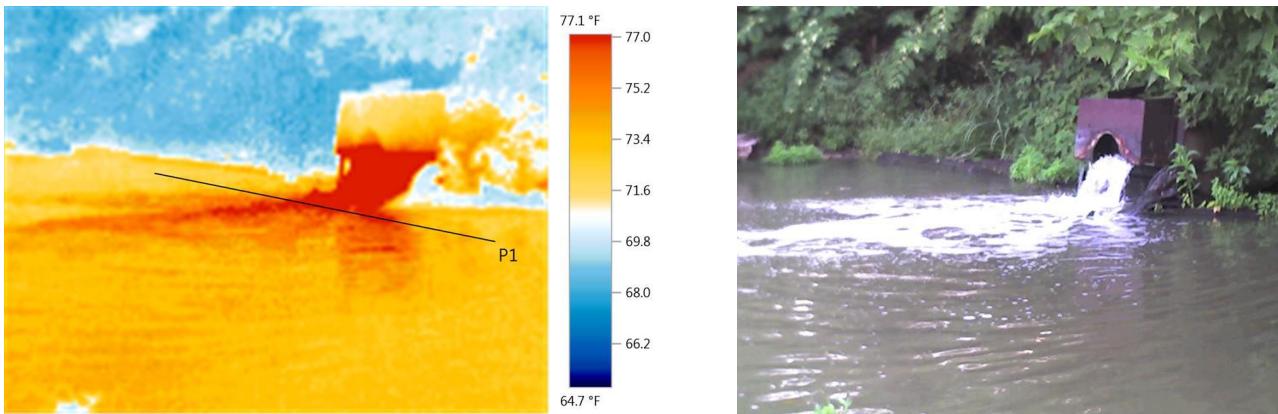
NOTE: Reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00825.BMT

Date:
8/18/2016

Measuring Time:
7:15:27 AM

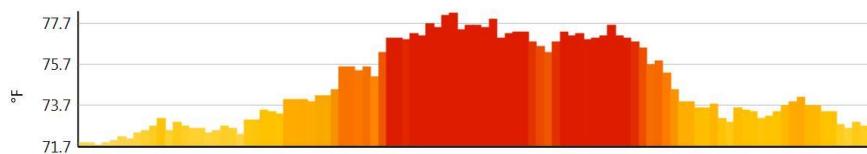


Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Profile line:

Minimum: 71.8 °F Maximum: 78.2 °F Average: 74.7 °F



Remarks:

Image location 825c

BASF outfall

Temperature of water discharge at the outfall is ~82.9 degrees F.

Temperature of Raccoon Creek surface is ~73.0 degrees F.

Temperature of shaded shore line under brush cover is ~68 degrees F.

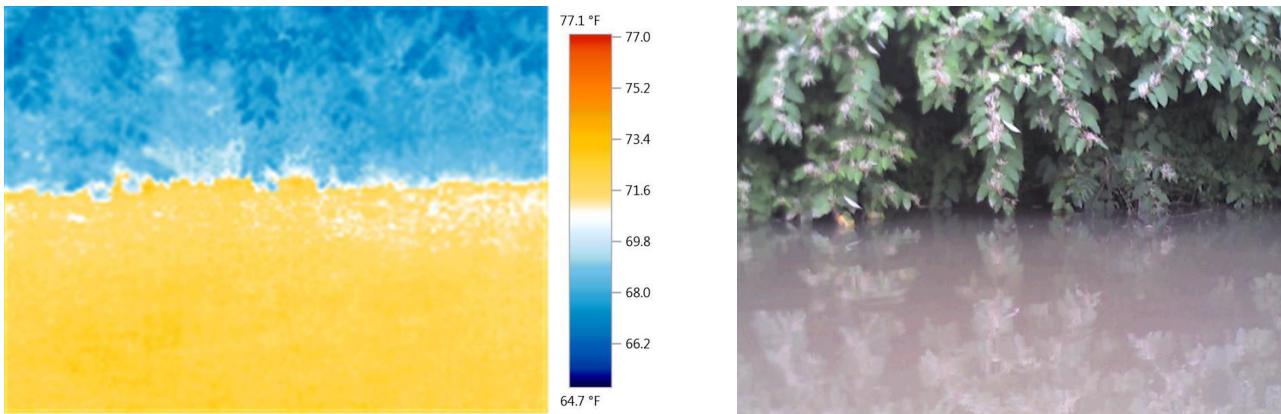
NOTE: Reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00826.BMT

Date:
8/18/2016

Measuring Time:
7:17:01 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Remarks:

Image location 826

Temperature of Raccoon Creek surface is ~72 degrees F.
Temperature of shaded shore line under brush cover is ~68.8 degrees F.

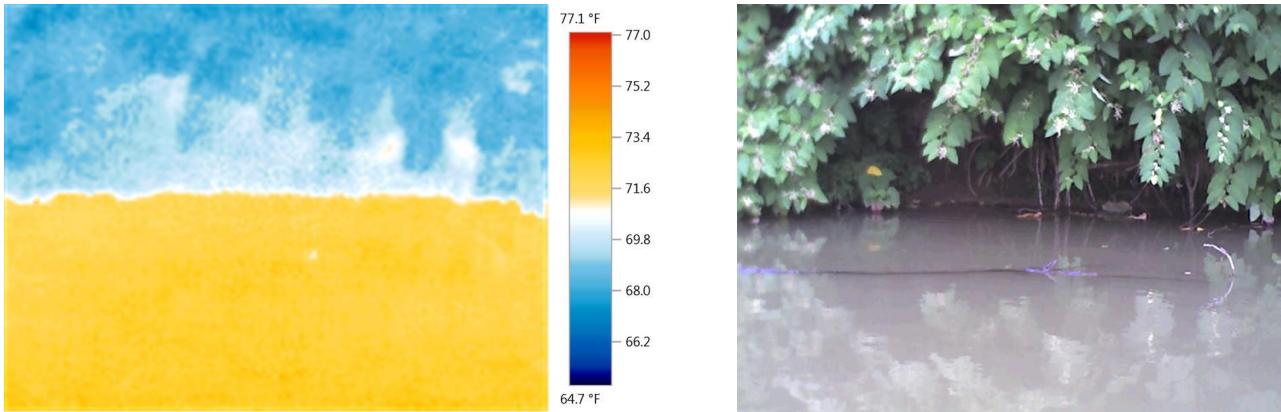
NOTE: Reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00827.BMT

Date:
8/18/2016

Measuring Time:
7:18:04 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Remarks:

Image location 827

Temperature of Raccoon Creek surface is ~72 degrees F.
Temperature of shaded shore line under brush cover is ~70 degrees F.

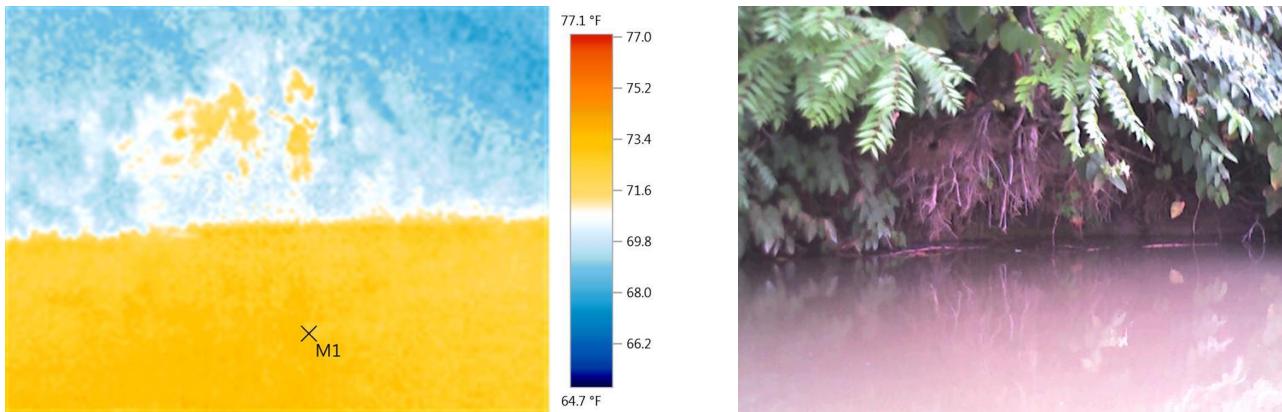
NOTE: Reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00829.BMT

Date:
8/18/2016

Measuring Time:
7:20:24 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Picture markings:

Measurement Objects	Temp. [°F]	Emiss.	Refl. temp. [°F]	Remarks
Measure point 1	73.0	0.93	68.0	-

Remarks:

Image location 829

Temperature of Raccoon Creek surface is ~73 degrees F.

Temperature of shaded shore line under brush cover is ~70 degrees F.

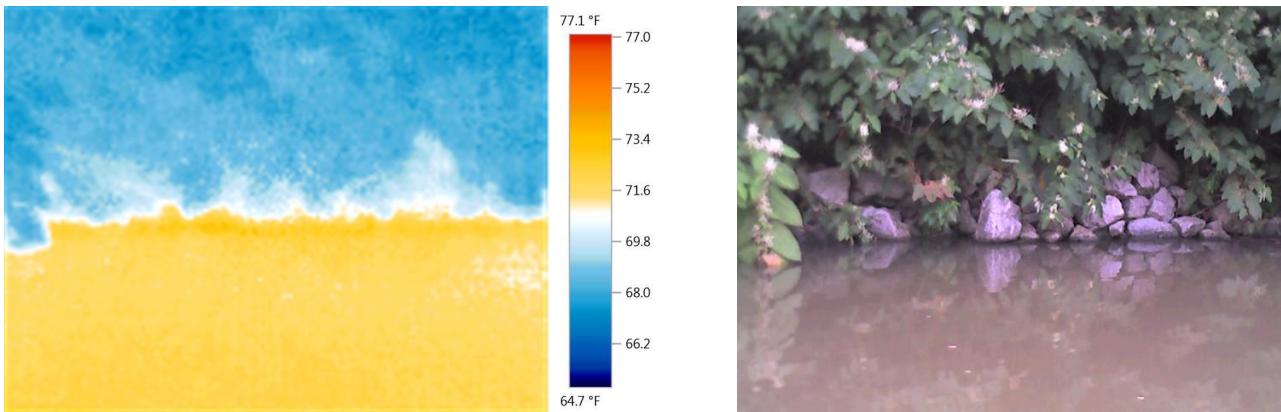
NOTE: Reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00830.BMT

Date:
8/18/2016

Measuring Time:
7:22:01 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Remarks:

Image location 830

Temperature of Raccoon Creek surface is ~72 degrees F.
Temperature of shaded shore line under brush cover is ~70 degrees F.

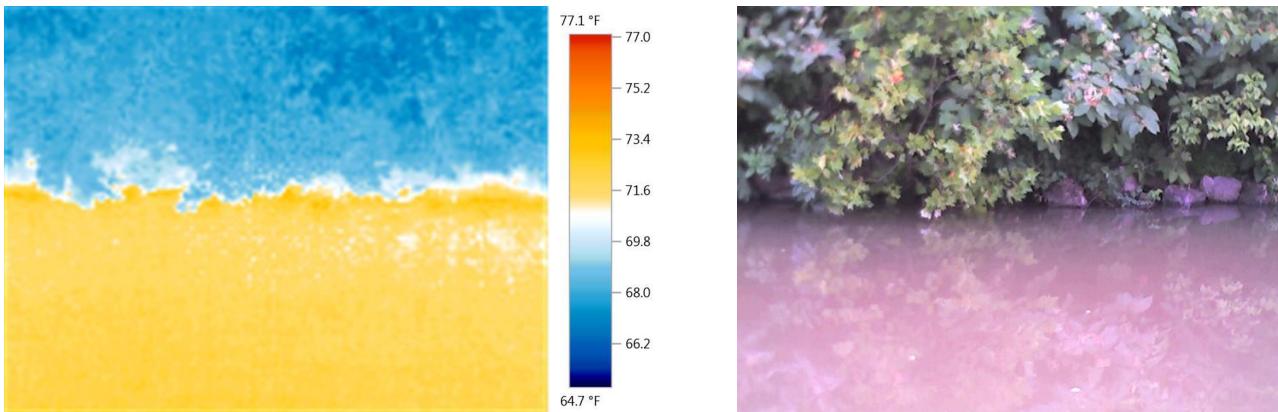
NOTE: Reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00831.BMT

Date:
8/18/2016

Measuring Time:
7:22:59 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Remarks:

Image location 831

Temperature of Raccoon Creek surface is ~72 degrees F.
Temperature of shaded shore line under brush cover is ~70 degrees F.

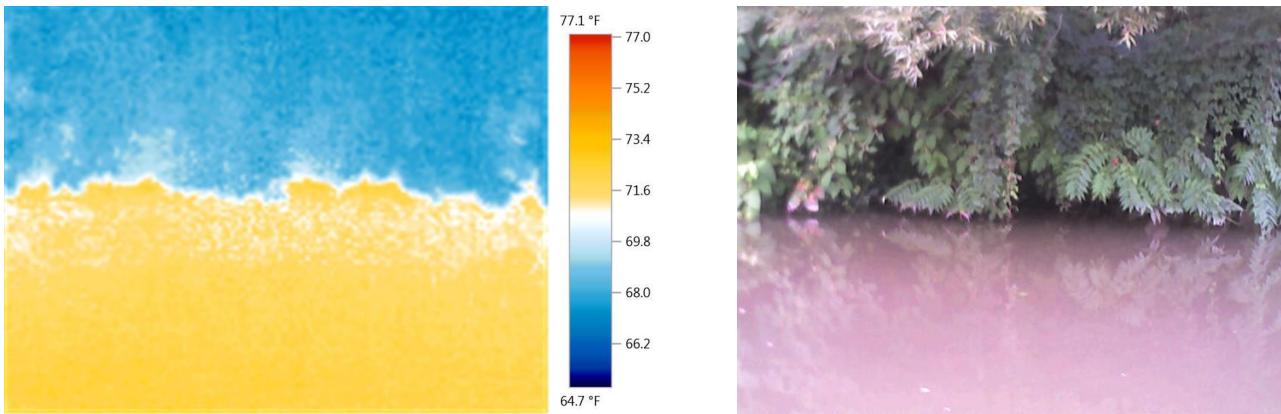
NOTE: Reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00832.BMT

Date:
8/18/2016

Measuring Time:
7:24:21 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Remarks:

Image location 832

Temperature of Raccoon Creek surface is ~72 degrees F.
Temperature of shaded shore line under brush cover is ~70 degrees F.

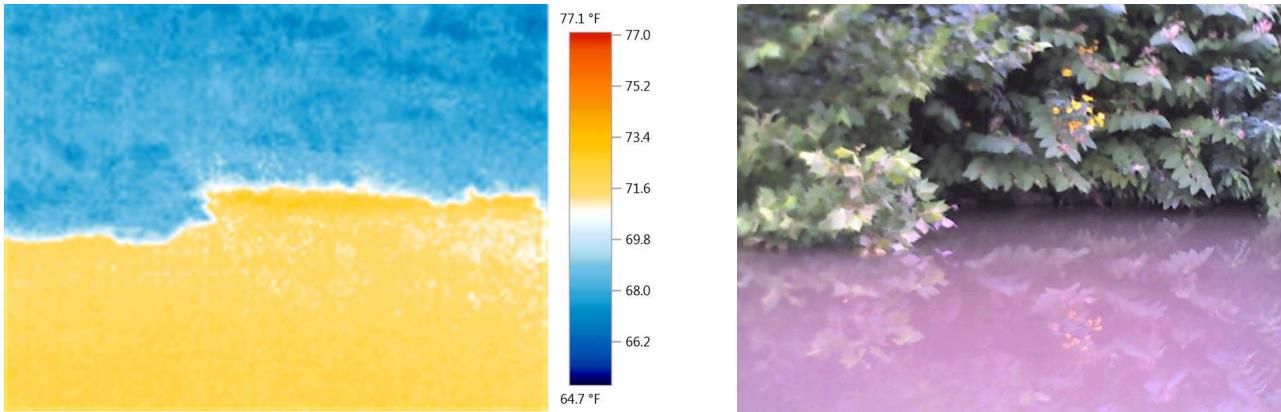
NOTE: Reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00833.BMT

Date:
8/18/2016

Measuring Time:
7:26:24 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Remarks:

Image location 833

Temperature of Raccoon Creek surface is ~72 degrees F.
Temperature of shaded shore line under brush cover is ~70 degrees F.

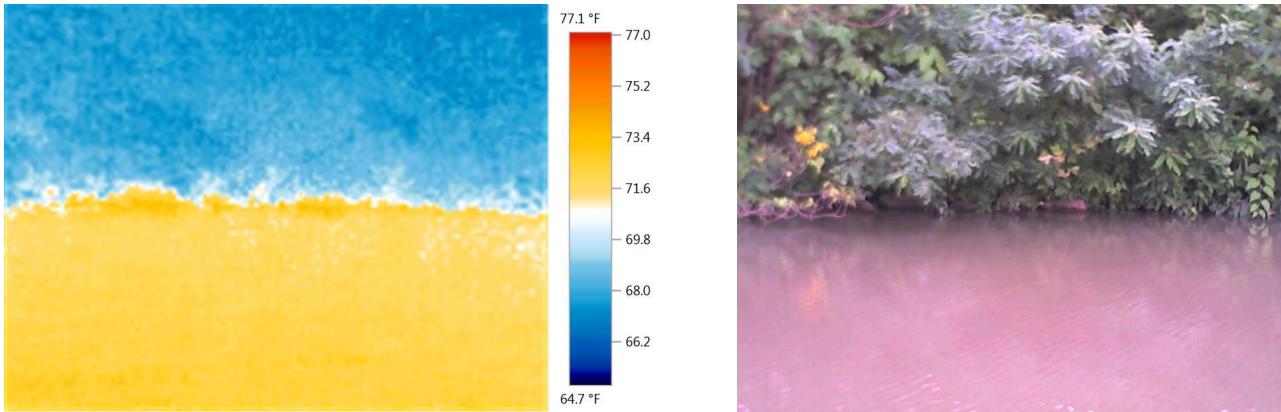
NOTE: Reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00834.BMT

Date:
8/18/2016

Measuring Time:
7:28:01 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Remarks:

Image location 834

Temperature of Raccoon Creek surface is ~72 degrees F.
Temperature of shaded shore line under brush cover is ~68 degrees F.

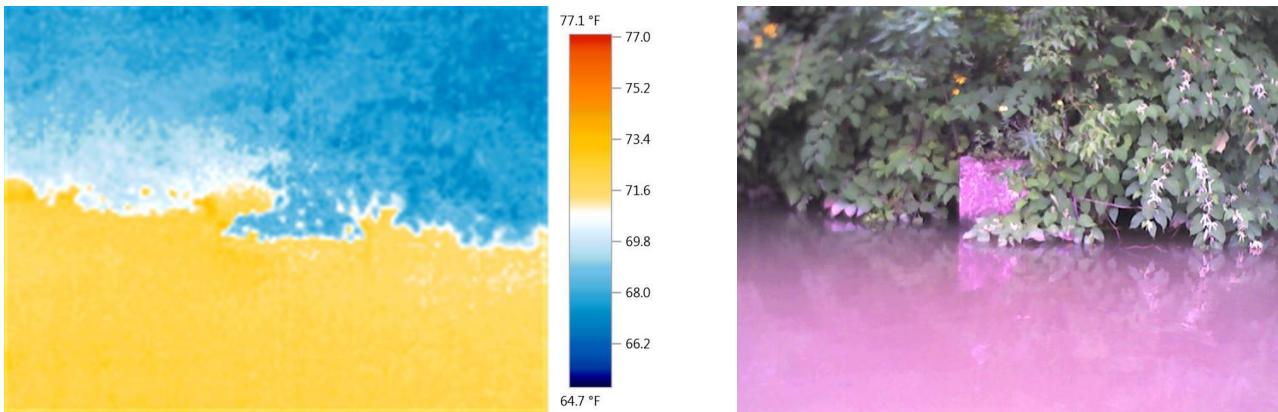
NOTE: Reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00835.BMT

Date:
8/18/2016

Measuring Time:
7:29:18 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Remarks:

Image location 835

Concrete structure appears to be an outfall but no discharge observed.

Temperature of Raccoon Creek surface is ~72 degrees F.

Temperature of shaded shore line under brush cover is ~70 degrees F.

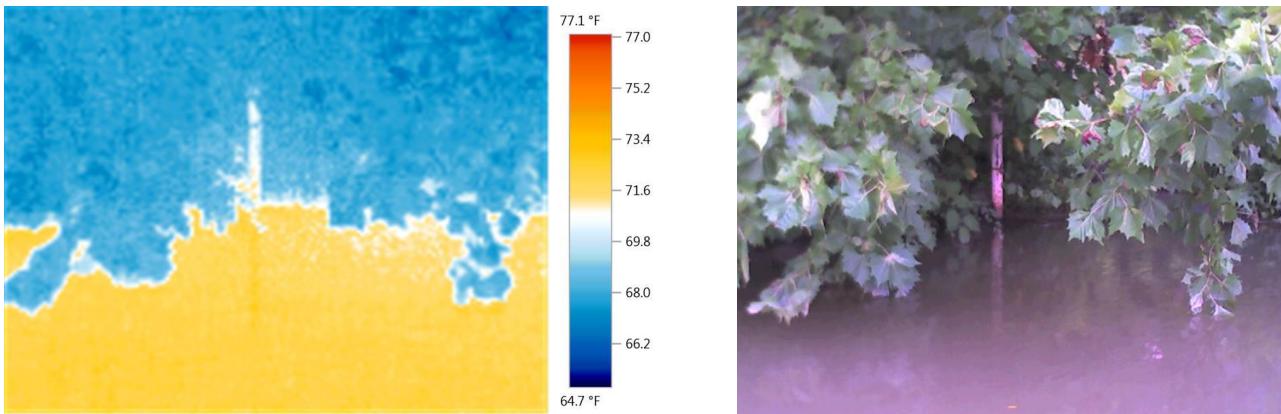
NOTE: Minor reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00836.BMT

Date:
8/18/2016

Measuring Time:
7:29:49 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Remarks:

Image location 836

Former "Boat Ramp" (rightcenter) and recently installed staff gage (immediately outside of picture to the right).

Temperature of Raccoon Creek surface is ~72 degrees F.
Temperature of shaded shore line under brush cover is ~69 degrees F.

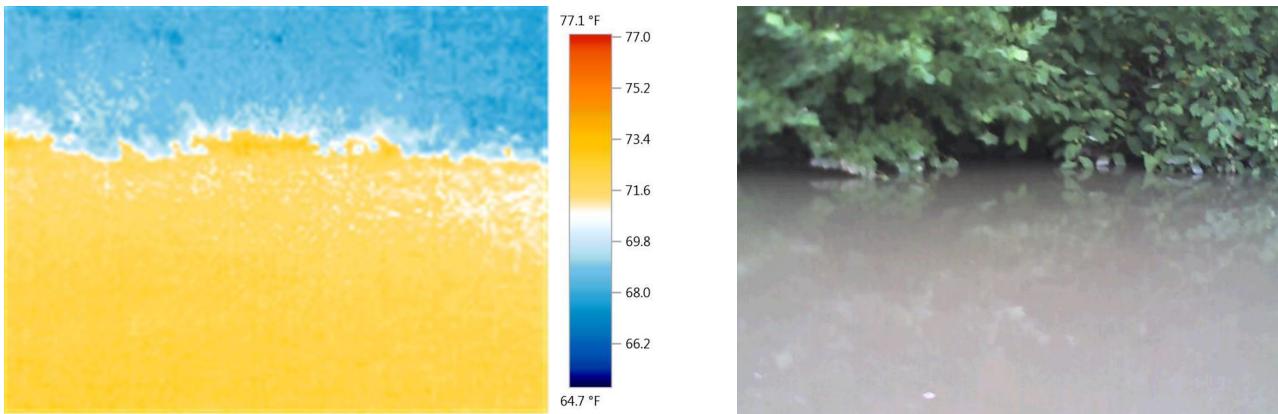
NOTE: Minor reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00837.BMT

Date:
8/18/2016

Measuring Time:
7:31:50 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Remarks:

Image location 837

Temperature of Raccoon Creek surface is ~72 degrees F.
Temperature of shaded shore line under brush cover is ~69 degrees F.

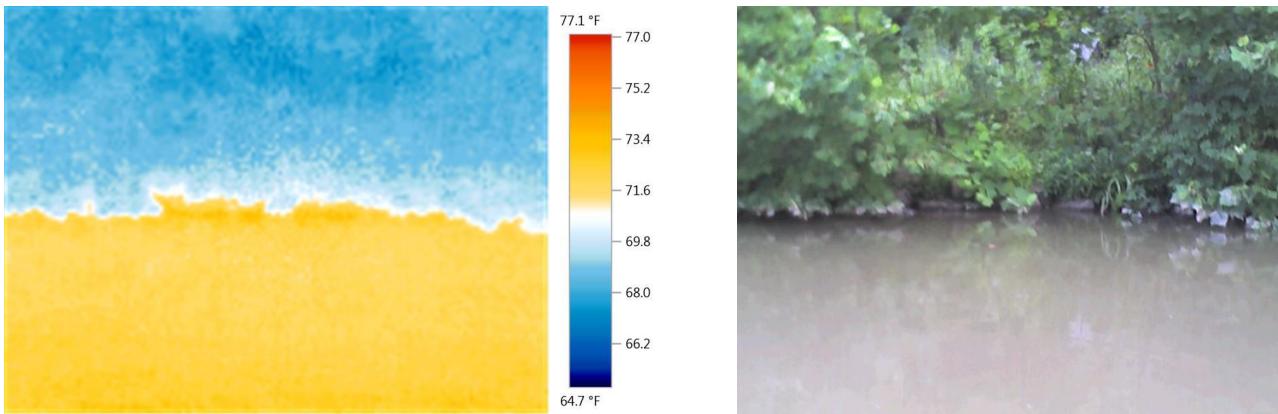
NOTE: Minor reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00838.BMT

Date:
8/18/2016

Measuring Time:
7:32:31 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Remarks:

Image location 838

Temperature of Raccoon Creek surface is ~72 degrees F.
Temperature of shaded shore line under brush cover is ~70 degrees F.

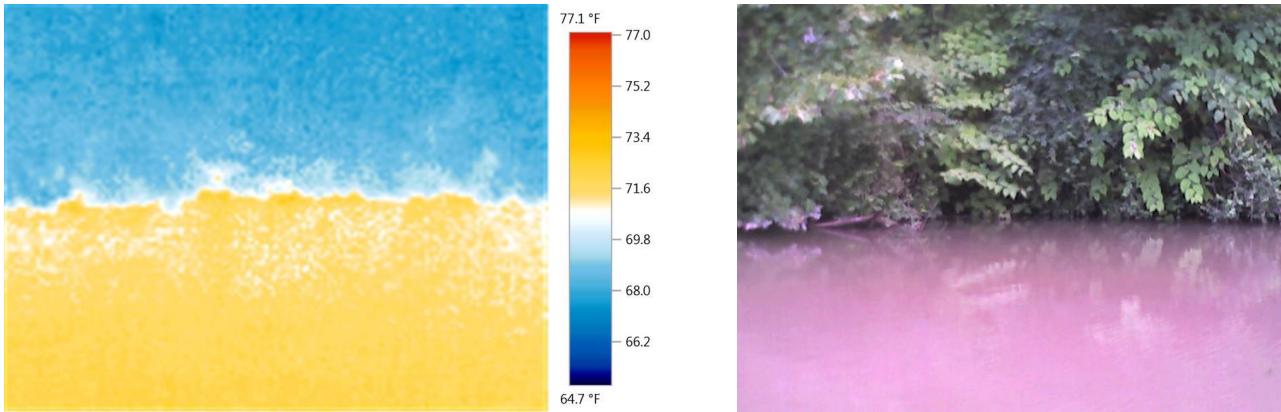
NOTE: Minor reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00839.BMT

Date:
8/18/2016

Measuring Time:
7:33:48 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Remarks:

Image location 839

Temperature of Raccoon Creek surface is ~72 degrees F.
Temperature of shaded shore line under brush cover is ~70 degrees F.

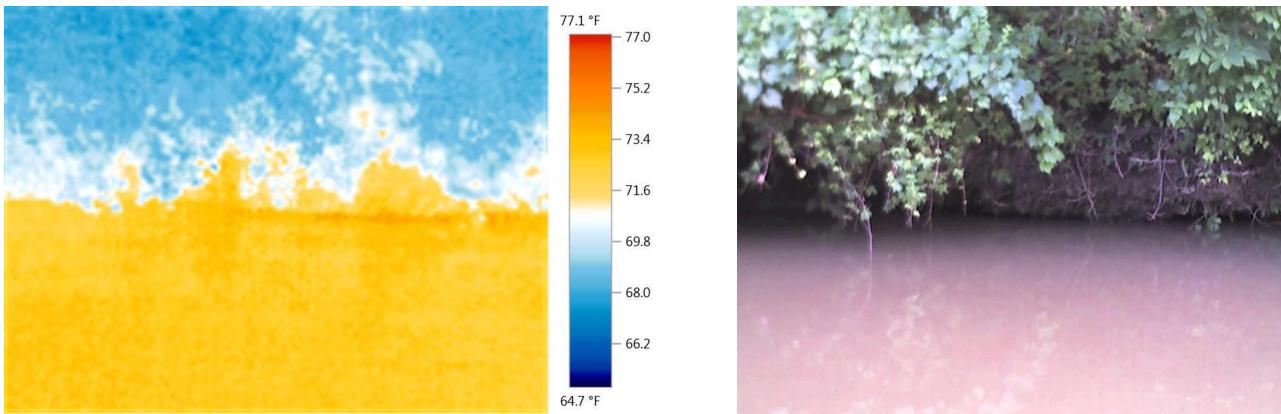
NOTE: Minor reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00840.BMT

Date:
8/18/2016

Measuring Time:
7:35:49 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Remarks:

Image location 840

Temperature of Raccoon Creek surface is ~72 degrees F.
Temperature of shaded shore line under brush cover is ~72 degrees F.

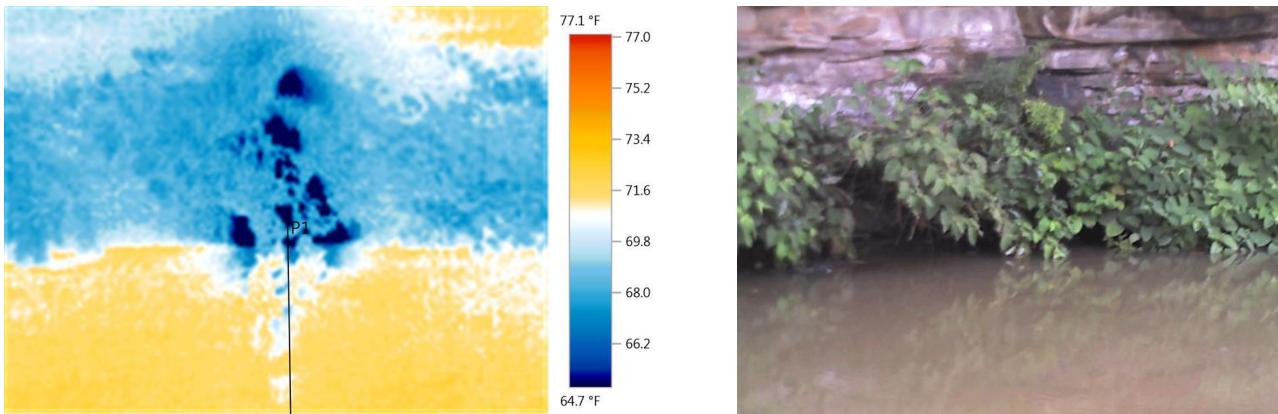
NOTE: Minor reflected thermal image detected on surface of Raccoon Creek.

Thermal Imaging Results

File:
IV_00841.BMT

Date:
8/18/2016

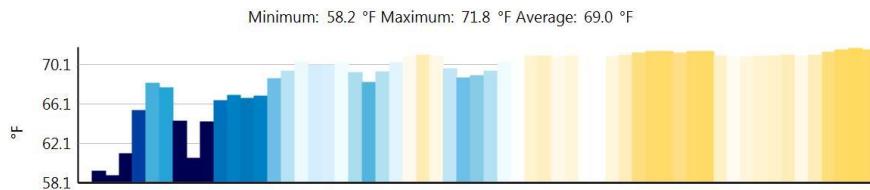
Measuring Time:
7:36:51 AM



Picture parameters:

Emissivity: 0.93
Refl. temp. [°F]: 68.0

Profile line:



Remarks:

Image location 841

Temperature of shaded rock overhang is ~69 degrees F.

Temperature of seep along rocks is ~58 degrees F.

Temperature of Raccoon Creek surface immediately below seep is ~67 degrees F.

NOTE: Minor reflected thermal image detected on surface of Raccoon Creek.

8/25/2016 ,

Keith Henn and Jon Aglio